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ABSTRACT

The report integrates findings of an international state-of-the-art study of augmentative communication, focusing on the interaction between a person using a communication aid and an able-bodied, natural speaker. Chapter titles and selected subtopics are as follows: (1) "Beyond Symbols and Switches: The Study of Communication Aid Use"; (2) "A Framework for Looking at Communication Use and Interaction" (purposes of interaction, the multi-modal nature of communication, use of communication conventions and strategies in interaction); (3) "Implications of an Interactional Model for Studying Communication between Aid Users and Others" (differences brought to an interaction by nonspeakers, their partners, and non-speech modes; the interactional process, augmented interaction); (4) "Our Current Knowledge Base on Interaction between Aided Communicators and Others" (sources of information, formal studies); (5) "Some Observations about Communicative Interaction between Augmented Speakers and Their Partners" (density of social interactions, negotiation and exchange of meaning, attitudes); and (6) "A Look toward the Future" (communication models and measures, research directions). Approximately half the document consists of appendices, including detailed summaries of unpublished research studies and studies in progress, structured contexts for the study of communicative use in augmentative communication, transcription and coding systems, and clinical observation forms and questionnaires. (JW)

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# COMMUNICATION INTERACTION BETWEEN AIDED AND NATURAL SPEAKERS

## A State of the Art Report

ARLENE W. KRAAT

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This report is a reflection of many people, perspectives, sharing and discussions from several parts of Europe and North America. Each of the contributors listed at the end of this report has added valuable observations or materials to our collective knowledge. They have contributed unpublished materials, questions, observations, diaries and concepts toward our greater understanding of communication in this new field of study. Most of all, they were able to momentarily stop their busy schedules to give of their time and selves toward a better understanding of where we are and how we might go even further. I am indebted to them all.

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# FOREWORD

The study that resulted in the publication of Communication Interaction Between Aided and Natural Speakers began in May 1983 under a fellowship provided by the International Project on Communication Aids for the Speech-Impaired (IPCAS). The study was an outgrowth of a genuine need by those working with augmentative communication systems and people using that technology internationally to gain a better understanding of how technology is being used by severely speech-impaired children and adults, and the nature of communication interaction. At the inception of this research, little was known about the subject apart from the findings of a few pioneering studies (Harris, 1978; Beukelman and Yorkston, 1980; Calculator and Dolloghan, 1982). However, there was a growing recognition that communication through non-conventional means is a complex process that requires more than the provision of a technical aid or device and symbol training.

IPCAS commissioned a state of the art study to create a collective information base from the participating countries of Sweden, England, Canada and the United States, and to provide direction for future clinical and research efforts. This report is the summary and integration of those findings.

The study focuses on one type of communication interaction: the interaction between a person using a communication aid and a person who is an able-bodied, natural speaker. It primarily addresses the child or adult with normal or near normal cognitive abilities who uses augmentation and interacts with others in everyday situations. It does not extend to a detailed discussion of the use of sign or other unaided communication systems, or the application of augmentative systems to persons with aphasia, severe language disorders or severe mental retardation.

The study addresses many of the questions that are being asked by all of us involved in making communication a reality for people with severe disabilities. How can we increase social interaction and communication between aid users and others? What research is going on? What vocabulary choices and communication strategies are of most help in achieving greater participation for aid users in everyday conversations? What should we be evaluating and observing?

This IPCAS report offers a forum to raise these important issues, to collect our observations, to integrate our current base of understanding and to benefit from one another's discoveries and common purpose. It also provides a base of published and unpublished research, methodologies and thought for new researchers interested in studying augmentative communication interaction.
Each of the participating countries has brought a different perspective to the project, with each participant strengthening the integrated whole.

Many of our initial efforts toward understanding and altering augmented interaction patterns and behaviors through training have been exciting and fruitful. As more professionals become aware of the importance of focusing on interaction and as the characteristics of the process of interaction between augmented and natural speakers becomes better understood, it is hoped that we will be able to maximize our use of current technology and raise the levels of social and communication interaction that non-speakers can achieve.

*Arlene W. Kraat*

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Arlene Kraat is on the faculty of the Communication Arts and Sciences Department, Queens College - City University of New York, where she coordinates the augmentative communication graduate training program through the Speech and Hearing Center. She was selected for the IPCAS Fellowship to study communicative interaction because of her extensive clinical experience and expertise in applying augmentative and alternative communication systems, and her long-standing interest in the interrelationship of language, human communication and technology.

During the past 12 years she has worked extensively with children and adults who use a wide variety of augmentative communication systems in social, educational and voctional settings. She was instrumental in developing an augmentative communication service at Goldwater Memorial Hospital - New York University Medical Center in 1976. At Queens College, she currently coordinates the Morton Roberts Center for Augmentative Communication, an evaluation and treatment center that serves non-speaking children and adults in the greater New York area. That clinical program is an integral part of the augmentative communication training program for graduate students in speech-language pathology. This graduate program has become one of the most comprehensive augmentative communication training programs in the Northeast United States.

Arlene Kraat is currently an associate editor of the new Alternative and Augmentative Communication journal. She serves as a consultant to several research and training centers and grants involving the application of communication technology, and is active in numerous national and international task forces and committees on augmentative communication. She has presented numerous papers and workshops, nationally and internationally, on assessment and intervention issues in augmentative communication, and has written several articles on intervention and the communication process.

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## CHAPTER I

## BEYOND SYMBOLS AND SWITCHES:

### The Study of Communication Aid Use

There are many ways to communicate. Even the most severely-impaired child and adult have some rudimentary means of communication available to them. This may be a head nod, non-verbal expression, eye gaze, vocalization or laughter that provides a social and communication link with others. I have watched in amazement as a 24 year old man used eye and head movements to form cursive alphabet letters to communicate with his parents, and as another young man formed idiosyncratic mouth postures to spell the first few letters of the words he wanted to convey to his mother. I recall seeing a young woman in an institutional setting relate that she was becoming very anxious and on the verge of a nervous breakdown by looking at a glass paperweight in front of her and making eye movements from the paperweight to the floor. A physically disabled child may try to interact with and tease a friend by staring at a picture of a Thanksgiving turkey on the classroom wall in an effort to call him "a turkey".

Traditionally, non-verbal and gestural means of communication have often been the only avenues open to severely impaired individuals. Although these forms of interaction have provided some access to communication, they are obviously limited from a social, psychological, cognitive and communication perspective. Such limited communication abilities often restrict interpersonal communication to one or two partners who have a significant amount of shared knowledge and experience with the non-speaker, and limit the level of communication and social interaction that can occur. One need only observe a non-speaking adult being unsuccessfully bombarded with a series of "yes-no" questions as he struggles to communicate a message, or a young child's body signals being misunderstood by his mother, to see how frustrating and limiting these rudimentary systems are.

Fortunately, different and expanded communication options are now available to severely handicapped children and adults in many parts of the world. During the last two decades, there has been a growing interest in providing greater communication to those with severe communication limitations. Through the combined efforts of several professions and many concerned people, the communication media for this population have broadened. Currently, there is a wide spectrum of non-electronic (manual) language boards and devices, visual symbol systems, gestural/sign systems, interfacing techniques and electronic or computerized communication devices which are available to facilitate communication. These communication aids provide the user with the ability to communicate through words instead of relying on someone else's skill at interpreting his or her body language and asking yes/no questions. Depending on the level of device sophistication, the non-speaker may be able to communicate linguistically in face-to-face conversations with another person, over the telephone, through writing and across the room, and to participate in group conversation. This potential for a higher level of communication and greater independence in that communication has afforded aid users the opportunity to widen social interactions and communicate with a variety of people beyond immediate family members and professionals working closely with them.

Clinical services for the disabled in the area of alternative and augmentative communication are rapidly evolving in many countries throughout the world. Increased numbers of children and adults with severely impaired speech are being provided with aids and devices that give them communication capabilities not previously available through non-verbal and vocal means. As these new techniques and symbol systems have been applied, numerous personal stories (James, 1982; McNaughton, 1983; Rush, 1983; Rubin, 1983; and Nolan, 1981), field studies (Izzard, 1973; Tew, Davies and Fletcher, 1980), and research projects (Silverman, Kates and McNaughton, 1978; Harris, Lippert, Yoder and Vanderheiden, 1979; Montgomery and Hall, 1980) have illustrated the benefits of these technical aids. It is obvious that these expanded forms of communication have provided a more sophisticated level of communication for many non-speakers. As might be expected, this increased potential has begun to open the doors to greater educational and vocational opportunities, and has widened the social network and personal independence for many persons who were previously dependent and isolated because of severe speech deficits.

In the early stages of this new field, professionals were mainly concerned with rapidly applying and transferring these new capabilities to the thousands of non-speaking children and adults who have desperately needed them for so long. Intensive energy was devoted to professional education, public education, advocacy and the setting up of service delivery mechanisms. Non-speakers were vigorously provided with communication devices and trained to use techniques for indicating language and visual symbol forms. Evaluation and selection protocols were outlined for matching these new aids to users. A variety of symbol forms were explored and applied, and new techniques for interfacing the physically disabled non-speaker to these language systems were developed. There was, and continues to be, a proliferation of augmentative communication devices each with greater rate capabilities than before, with speech and print-out capabilities, and with greater stores of vocabulary than was ever thought possible.

In general, we have been preoccupied with symbols and technology and teaching the mechanics of using augmentative systems. In this flurry of activity, little attention has been given to studying the nature of the new communication that is taking place via augmentative

## CHAPTER I

## BEYOND SYMBOLS AND SWITCHES:

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In the early stages of this new field, professionals were mainly concerned with rapidly applying and transferring these new capabilities to the thousands of non-speaking children and adults who have desperately needed them for so long. Intensive energy was devoted to professional education, public education, advocacy and the setting up of service delivery mechanisms. Non-speakers were vigorously provided with communication devices and trained to use techniques for indicating language and visual symbol forms. Evaluation and selection protocols were outlined for matching these new aids to users. A variety of symbol forms were explored and applied, and new techniques for interfacing the physically disabled non-speaker to these language systems were developed. There was, and continues to be, a proliferation of augmentative communication devices each with greater rate capabilities than before, with speech and print-out capabilities, and with greater stores of vocabulary than was ever thought possible.

In general, we have been preoccupied with symbols and technology and teaching the mechanics of using augmentative systems. In this flurry of activity, little attention has been given to studying the nature of the new communication that is taking place via augmentative communication aids. There is the general impression that higher and more effective levels of communication are occurring. This is based on clinical impressions, subjective reports of families and teachers, and the remarkable accomplishments made by outstanding non-speakers with the assistance of this new technology. However, little documented information is available as to how these devices are actually being used by non-vocal children and adults in everyday environments and conversations.

Augmentative communication devices are a poor substitute for natural speech. Although they have brought markedly increased potentials and levels of communication to many non-speakers, these devices still present serious limitations in comparison to speech production. First, the rate of communication that is possible through an augmentative aid is severely limited. It is not uncommon to find reported rates of from two words per minute, to 25 words per minute in device use (Foulds, 1980). This puts the aid user at a serious disadvantage when attempting to converse with a natural speaker with rates of 150-175 words per minute. Second, those children and adults who do not possess sufficient spelling skills are restricted to the pre-arranged and limited vocabulary in these devices. In many cases, this may be as few as 60 words, or 350 words, or 800 words. Rarely does a non-speaker without spelling skills have 5% of the vocabulary items available to a talking, 7 year old (Mott, 1973). Last, the modes of communication used in augmentative communication are very unique in our speaking world. Decoding a child's eye movements and coded vocabulary on an Etran chart takes a different level of participation from a communication partner than does a shout from across the room. Attempting a conversation in a noisy environment or talking to a stranger with a speech synthesizer that is less intelligible than natural speech may create genuine problems in understanding. A child who is trying to relate using Blissymbolics the excitement of a weekend experience in which his hamster had a litter, needs a very special partner with patience and good guessing skills. These unique modes of communication exchange are different from the quick, intelligible speech that serves as the basis of most conversational discourse.

Given that communication devices do not provide a direct substitute for natural speech, and are limited or different in terms of communication rate, vocabulary access and communication modes, it can be expected that communication via these systems has many unique characteristics and limitations. Some aspects of conversation and communication may be difficult or almost impossible to accomplish with our present systems while other components may be achieved very successfully. Given the constraints in augmentative modes, it is also quite probable that interactions between aid users and others are accomplished in a different manner than interactions between two speaking partners. Both the user and the communication partner must make adaptations to this unique medium.

In developing this understanding, it is important to look at the optimal levels of interaction that can be achieved, and to also examine the variety of interactions that are taking place between users and their conversational partners. Given the differences in communication devices, users and their partners, it is probable that varied levels of interaction are being actualized by different communicators. In our search to understand both the optimal levels that can be achieved and to gain a perspective on what is actually happening between communicators and how, it is important to observe and study interactions in natural situations. For it is in everyday situations that a non-speaker needs to successfully engage in conversation and communication. And it is in this domain of daily use that we need to measure our success as teachers and aid developers. One can observe the rate of communication, the accuracy of indication and language abilities in the laboratory or clinical situation. However, this is not necessarily representative of what the aid user has to contend with in daily interactions or of how those interactions are negotiated. We need to know how augmented communicators are actually doing with the new potentials afforded them in everyday interactions: in the lunchroom, on the bus, with a family group in the living room, in a college or elementary classroom, in starting a conversation with somebody new or while just "hanging out" with friends.

It is the purpose of this IPCAS study to bring together, from an international perspective, our current knowledge and understanding of communication interaction between augmented and natural speakers. This information is of importance to aid developers, therapists, teachers, health planners and researchers alike. As as a field, we have just begun to look at the nature of those communication interactions. As a result, the published information is minimal, and our information fragmented. This study report attempts to integrate information from a variety of sources in the United States, Canada, England, Sweden and Scotland. It is a compilation of published research, unpublished studies, clinical observations and the perspectives of a variety of users and thoughtful professionals in these countries. Hopefully, this integration of current thought and research findings will further our understanding of how we might study this type of communication interaction, and solidify what we currently know about interactions between aid users and others. It is also hoped that this collective base of information can serve as a foundation from which future research and clinical efforts can emanate.

# CHAPTER II

# A FRAMEWORK FOR LOOKING AT COMMUNICATION USE AND INTERACTION

Communication and interaction are complex and multi-faceted aspects of human behavior. How we construct those interactions with each other, and for what purposes, is an area of great interest to communication scientists, philosphers, linguists, anthropologists, sociologists, psychologists and ethnologists. Communication bonds people who are strangers, potential new friends, parent and child, boss and worker, playmates, friends, students and teachers, among others. People communicate with each other for a variety of reasons: to connect, to bond, to commiserate, to get acquainted, to be socially appropriate, to discuss, to tease, to establish roles and power positions, to hurt, to express love and to control. We do this using a variety of behaviors, from a look to a sneer, to a movement toward or away from someone; we communicate by words and sentences, vocal characteristics such as pitch, stress, pause and intensity, and even our dress and appearance. These behaviors are couched in an elaborate rule system for discourse and social interaction.

To begin to study and understand interaction between communication aid users and others, it is important to have a broad, interdisciplinary base of knowledge about normal interaction between able-bodied, speaking children and adults. It is beyond the scope of this study to review current thinking and perspectives on this broad and complex subject in any detail. However, some aspects of the interactional process which are central to an understanding of current research and thinking about augmentative communication device use will be reviewed briefly. Several resources are suggested for those interested in further reviewing contemporary thought on communicative interaction: Saville-Troike (1982), Stubbs (1983), Lamb, Suomi and Stephenson (1979), Duncan and Fiske (1977), Labov and Fanshel (1977), Ochs and Schieffelin (1979), Preissler (1983), Prutting (1982), Erwin-Tripp (1973) and Bates (1976).

## Communication and Interaction

The conceptual and working definitions for "interaction", "communication", and "communication interaction" are not mutually agreed upon and are viewed differently by various researchers. The definitions and meanings as they are used in this report need to be specified.

"Interaction" occurs when people come together (Bullowa, 1979). This interaction need not be through spoken words. It can be through joint activity such as a tennis match, splashing each other with water in a swimming pool, playing "He-Man" with imaginary swords or just lying in the autumn leaves with someone. The interaction can be physical, social, communicative or a combination of these. By the nature of the word itself, the behavior includes "action", and the interplay of actions between two or more people. What one person does or does not do has an effect on the other person. The other person's reactive behavior in turn influences the subsequent behavior of the other. This interaction is continous and cyclical in manner.

Communication can take place in an interactional context, or outside of such a context. For example, many of our written communications take place when the sender and the receiver are not in the same place at the same time. The communication may be received by the other party two days or two years later. Other communication exchanges take place in an interactional context in which the persons involved are present and interrelate. This particular study addresses communication events that occur within an interactional framework between persons who use augmentative communication means and the people they communicate with.

In this study, communication is viewed in a broad sense. It is seen as encompassing a wide composite of behaviors that convey meaning: spoken and written forms, non-verbal behaviors, paralinguistic features such as stress and pause, body postures, touch, distances and appearance, to name a few. Communication takes place through actions that a person makes in an effort to convey a particular intention to another person or persons, or through actions the person unconsciously makes that convey an intention. In this study, communication events will include efforts a person makes which are not necessarily successfully completed (i.e., the intention of the speaker is not fully realized).

Communication interaction, then, is a dynamic process between at least two people which is highly interactive, bi-directional and multi-modal. The behaviors of each person continually affect the behaviors of the other(s) in a constantly changing and elaborate communication and social process. This interaction is governed by rules of discourse, roles and rules for social interaction, mutual understanding of the code and rules for language use, and individual styles and strategies for achieving these ends.

## The Purposes of Interaction

Why do people communicate with each other, or choose not to communicate? The answer to this question seems central to our understanding and training of communicative interaction. However, this is a much more complicated question than it may first appear to be. Human communication can be viewed from numerous perspectives -- that of general semantics, psychology, sociology, anthropology, linguistics, pragmatics, cybernetics, information theory, and so on. Each approach introduces a slightly different understanding of what communication is, and why and how it functions. The resulting picture is fragmented, not unlike the classic tale of men looking at an elephant from different sides and heights, each coming up with different conclusions as to what the elephant looked like. In and of themselves, none are holistic.

As a framework for this particular study of interaction between augmentative device users and others, three perspectives will be briefly outlined. These were selected by the author for discussion because they are currently addressed by contemporary studies of augmented speakers, or because they have been raised as important issues for consideration in studying this type of interaction in discussions with a variety of persons in the international project (Personal communication - A. Newell, D. Yoder, A. Warrick, R. Creech, S. Wollner, M. Lundman, J. Eulenberg, H. Shane, M. Buzolich). The interpretations of these perspectives are the author's and are not intended to be inclusive.

On the surface, communication interaction may appear to be the exchange of semantic meaning or the transfer of information that has a particular grammatical structure and choice of words attached to it. The speaker utters a particular sentence and attempts to get the "listener" to understand what is meant. Why one communicates can also be examined by looking at: (1) the intentions of the speaker from a "speech acts" perspective; (2) the intentions of the speaker from a social perspective; and, (3) the intentions of the speaker from a psycho-social perspective. These divisions are quite arbitrary and are separated here for discussion purposes only. These different functions of language use often occur simultaneously and are highly interrelated.

Communicative Intentions From the early work of Austin (1962), Searle (1967; 1969) and Dore (1975; Halliday, 1975) has evolved a speech act perspective to examining interaction. In this frame, one looks beyond the surface statements to the speaker's intentions (e.g., Was it to persuade, convince, annoy, amuse, bore, tease, get information?). In other words, why was the utterance made and how is it intended to affect the listener? Interaction in this perspective takes place at the level of intentions. What was said by the speaker was selected with an intention to maintain or affect the listener's beliefs and actions in some manner. The listener, in turn, must recognize the intentions of the "speaker" via knowledge of the rules governing language use, and decide how to comply or not comply with those intentions. Take an utterance such as, "It's hot in here." The obvious meaning is to relate that the temperature is hot. However, said in a particular context (e.g., when the listener is sitting next to a window or air conditioner), this utterance may be said to get that person to open up the window, or turn the air conditioner on. The utterance was not said to share meaning about the temperature of the room, per se.

Speech act theory has led researchers to develop taxonomies for coding the various "intentions" or functions that might be involved in an interaction between people. (Schnelle, 1971; Dore, 1975; Halliday, 1975; Dore, Gearhart and Newmam, 1978; Coggins and Carpenter, 1981; Prutting and Kirschner, 1983). To date, these coding systems vary widely in so far as what intentions are coded, how those speech acts are defined and the developmental level of the language use for which they are intended. They also differ in the communication theories that serve as their basis.

In examining the various coding systems for communicative functions, it is important to note their differences. Some taxonomies emphasize the language functions of an utterance (e.g., requests for information) almost exclusively; others expand and include various discourse functions (e.g., opening a conversation; maintaining a speaker role). Still other analytic schemes encircle functions and intentions that seem to be primarily psycho-social in nature (e.g., Halliday's interactional and personal functions; affective and role determined acts of Schnelle). The work to date on language development in children and the interactions of augmented communicators have primarily addressed the language functions of an utterance.

Social Intentions or Functions It has been suggested that people talk with each other to achieve certain social goals, not just to transfer meaning and information. (Goffman, 1963; Labov and Fanshel, 1977; Cook-Gumperz and Gumperz, 1978). That we often communicate for reasons that are more social than to convey specific meaning is suggested in the work of Steiner (1975), who found that conversations contained very small amounts of information that could be viewed as directly informative. Communication bonds people together in some fashion as human beings and serves as a vehicle, or connection, for social agendas as well. One may talk to be socially appropriate (e.g., while waiting for an elevator; answering a social greeting); or to be accepted as part of a group (e.g., taking on the values or conversational style of that group; talking about specific topics that bring forth comradery). One may also talk to become acquainted with, or recognized by, a particular person.

To illustrate the social function of some utterances, take the example of someone starting a conversational sequence by, "When is Frederick coming back?" This may appear to be a question that attempts to gain information. However, that may or may not be the person's intention in doing so. The question may have been asked just to start an interaction or social connection. It may have been uttered to let the other person know that you care about them; or, as an excuse to make a human connection and share feelings with someone else.

Psycho-Social Roles Language can also be used for the purpose of reflecting personality (i.e., who I am or want you to think I am). In a particular communicative event, this may be the major purpose of a specific utterance. I may want to say that I am powerful, bright, normal, "hip", feminine, nasty or tough. It may be that I want you to know that I am funny, sensitive, artistic, friendly, a risk taker, a pessimist or an optimist. One may also have, as a main intention in an utterance, the desire to establish a particular social role or power role in relation to another person or persons in a group. Labov and Fenshel (1977) suggest, "the crucial actions in establishing coherence of sequencing in conversation are not such speech acts as request and assertions, but rather challenges, defenses and retreats, which have to do with the status of the participants, their rights and obligations, and their changing relationships in terms of social organization.... These relations move along several dimensions which have been identified most usefully as power and solidarity." (p. 58) Many personality characteristics and role relationships are defined through language. In a broadened view of communication purpose, this relationship is important to understand and has been effectively studied by business executives and multi-national corporations to their advantage.

Clearly, communication acts and social acts overlap. Some of these social interaction issues are raised here as they are frequently ignored in current work on interaction in favor of standard taxonomies that address the more traditional speech acts based on language intentions (e.g., requesting information). We need to also look at interaction as a means whereby persons just seek to belong to others, to gain entry into social groups and relationships, to be liked and accepted by others -- to be human.

## The Multi-Modal Nature of Communication

We communicate not only with words, sentences and linguistic content, but with a variety of non-verbal means: physical distances and postures, gestures, vocalizations, attentiveness, appearance and silence -- that is, what we don't say (Argyle and Cook, 1972; Ekman and Frieson, 1975; Duncan and Fiske,1977; Poyotos, 1980; Bullowa, 1979). Sitting down to talk to a person rather than standing may signal, "I want to talk to you seriously." Pointing to a plate of spicy food, covering the mouth and enlarging the eyes says, "It is more than hot!" Not making eye-contact with the person sitting next to you on a plane may convey, "I don't want to talk to you." Wearing a long student cape and riding a bicycle to work communicates a statement about who I want you to think I am and how I probably think. Pausing in an utterance and not looking at the other person can mean, "I am not finished with my turn at speaking." Doodling and flipping through papers while someone is talking to you may communicate disinterest. A rising intonation at the end of a statement may suggest indecision or tentativeness on the part of the speaker.

Most of us are not consciously aware of our use and interpretation of non-speech behaviors in conversation unless it is brought to our attention, or a speaker-listener somehow violates the rules for use of these behaviors. However, many of these signals serve to clarify or express our intentions and meaning, and serve as regulators or interaction signals for the orderly construction of conversation. For example, certain aspects of turn-taking in conversation are regulated by non-verbal behaviors. Duncan and Fiske (1977); Argyle, Ingham, Alkema and McCallin (1973); Sachs, Schegloff and Jefferson (1974); Craig and Gallagher (1982), among others, have outlined regularities and rule-based behaviors in our use of facial and body gestures that serve to shift the speaker roles from one person to another. For example, the person who initiates the talking usually makes eye contact with the other person, then looks at a point outside of this eye-contact region (e.g., to the side). When the speaker nears the end of a turn, eye gaze is returned to the partner. This, coupled with changes in vocal pitch, body postures and/or body movements, signals to the "listener" that he or she can take a speaking turn. Other behaviors serve to hold the speaker's turn during a pause (e.g., rising inflection, lack of eye contact, body posture), or signal a listener's desire to get a turn (e.g., raised hand, posture shift, open mouth posture). These turn-taking signals systematically organize the exchange of speaker roles and provide rules for how to take a turn, when it is appropriate to take a turn, and when and how to relinquish a turn. Turn-taking behavior illustrates only one way that non-verbal behaviors and paralinguistic features of spoken speech are an integral part of our communication system. There are many others. These non-verbal and paralinguistic behaviors are important features of other areas of discourse structure. They provide feedback information and a reading of emotional states, and help us form expectancy hypotheses about a communication partner's beliefs, motives, abilities and "normalcy".

Non-verbal and paralinguistic behaviors also can convey communicative meaning in and of themselves, or confirm and amplify the meaning evident in the spoken language used. If a person says "Can you get it?" and points toward a stack of books, the referent for "it" is understood. A conventional sign for "boring" made with the index finger twisted on the side of the nose to a friend during a lecture has a meaning that is understood without words. "I care about you" may be believed or not believed depending on the vocal characteristics, facial expressions and eye gaze accompanying the statement. The meaning of, "He took the laundry there," changes depending on which word is stressed, or elongated, or the intonation pattern used.

Until recently, researchers in communication disorders and communication development tended to ignore the non-verbal or non-linguistic aspects of communication. They focused primarily on the spoken language content. Although non-verbal behaviors and contextual information may have been acknowledged, they were seen as peripheral to communication and conversation, and not included in most communication descriptions and research projects. Interdisciplinary research efforts, interest in the pre-speech communication of infants and the shifting of attention to the pragmatic aspects of communication and away from concentration on the syntax and semantics of language, resulted in increased attention and understanding of the importance of non-linguistic aspects in communication.

In studying communicative interaction between an augmented speaker and others, it is important to examine the linguistic, non-verbal and paralinguistic aspects of that interaction. This broadened concept of what constitutes communication behavior allows us to tap the rich flow of information that is passed from one person to another in a conversational exchange. Given research which examines the many channels and variables involved, we will have a better understanding of how meaning is generated, negotiated and interpreted in this very unique form of communication.

## Language: The Pieces and the Rules For Use

The natural languages in any country have a specific syntax and vocabulary. This form is used to express a variety of semantic referents, relations and propositional meanings between people who share in that common language. The use of that language form and content is further shaped by a complex set of social and conversational rules that apply to how it is used when interacting with a variety of partners and situations.

It is not enough to know the vocabulary and grammar of a language, as many of us studying foreign languages have discovered. Granted, these are the message elements of cultural communication. However, in and of themselves, form and content are insufficient when faced with a social partner, a specific context, and fluid conversational and social structures. How one applies that form and content is dictated by the social context, the prior utterance and utterances in the conversation, the physical environment and non-linguistic support available, as well as the mutual understanding of the ways in which impressions and intentions are conveyed. This is a formidable task governed by an intricate set of cultural/social rules, as well as discourse rules.

Interactions, then, are the application of form and content to an interactive and social process governed by rules for communication exchange in a particular social context. This is best illustrated through an example in which the social and linguistic rules are violated. A person may go into the coffee shop and order in the following manner: "Joe wants two donuts. Joe wants a chocolate donut. Joe wants a coconut donut. Joe wants the coconut donut in the box. Joe wants to take the box to the car. Joe will pay now. Joe is going home." In the United States, this use of language in a donut shop is semantically and syntactically appropriate. However, it is certainly not typical of how one uses language in that context. A more normalized utterance might be: "Give me a chocolate and coconut donut to go." Whether or not we integrate information within one sentence or use a series of simple sentences is dependent on the abilities of the person we are addressing and the nature of the communication task. A series of simple sentences might be used in describing a series of pictures in a sequencing task in school, or in addressing a very cognitively limited person. The repetition of a person's name is also generally not used in this context (i.e., ordering). When and how one uses proper names vs. pronouns is based on rules of presupposition and the type of communication that is taking place. For example, it is appropriate to repeat the name of an addressee from the stands of a baseball game (e.g., "Come on, Joe; hit a home run for me, Joe."). Different contexts demand different uses of language. This requires knowledge beyond the vocabulary and grammar of language.

A child may want to get into a heated discussion about flying saucers. He has at his disposal a variety of language forms and content to get into the conversation. However, that knowledge alone does not tell him which form to use to gain entry into this peer discussion, and which forms not to use (e.g., "Hey guys, let me talk too," or "Stop talking and give me a turn."). To be successful, this child must also know when he can take a turn and enter into the conversation (e.g., at appropriate turn taking points) versus when he is interrupting. This requires knowledge of language in actual use.

Two strangers in an elevator may exchange social greetings and acknowledgments. However, if on parting one stranger said to another, "See you later", it would be considered inappropriate. In English, this farewell greeting is reserved for two people who are well acquainted and who will, in fact, be seeing each other later. Two strangers would depart with a non-verbal nod, smile or "Have a nice day." Again, this example illustrates that knowledge of language is incomplete without the knowledge of rules for its use in conversation and social contexts.

The physical environment surrounding a communication exchange also affects language use and changes from one situation to another. Olsen (1970) illustrated this by describing changes in our utterances as the physical objects in front of a "speaker" and "listener" vary. Given a series of colored circles and squares, the wording of a request for a specific item changes. For example, faced with two squares and a round item, the speaker might say, "Give me the round one." Given the same round item placed with another round item and a square, the speaker might say, "Give me the large, round one," or "Give me the white one." How the request for the same item is worded is dependent on the physical context.

Using language in everyday situations also requires an understanding of how to alter the way in which something is said in order for it to fit with the utterances that came before it. An isolated utterance such as "Yeah, I did," is not very understandable. However, if the preceding utterance was something like, "Did you read Schell's piece in the New Yorker?", it is perfectly clear. Further, for the person above to have responded, "Yes, I read the piece by Schell in the New Yorker," would be considered a bit strange or a sign of annoyance, although it is semantically and syntactically correct. As language users we need to know how to adapt utterances in the fluid exchange of ideas. We need to know what is known and not known to both partners. Recent work in the area of pragmatics has furthered our understanding of how prior linguistic and non-linguistic contexts affect our use of language in a variety of ways (Rees, 1982; Rees, 1978; Lund and Duchan, 1983; Keenan and Schiefflin, 1975). Again, knowledge of syntax and semantics alone does not provide guidance in how to use language in conversational interaction.

The language and non-verbal behaviors used in any given situation are dependent on the context, the communication task, the communication partner, the previous communication and what the speaker wants to accomplish (i.e., intentions). This is couched in an elaborate set of social and language usage rules. The study of communicative interaction cannot be viewed just as the study of what words, syntactical forms and meanings are overtly expressed. Language is used in context and must be studied and understood within that framework.

## The Interaction Context: The Participants and Communication Setting

Figure 1 illustrates some of the components brought to the communicative event by the participants, and the specific context. This composite dyadic model is based primarily on the works of Prutting (1982), Ochs (1979), Lund and Duchan (1983), Ervin-Tripp (1973), Cook-Gumperz and Gumperz (1978), and is outlined to serve as a framework for the discussion of augmentative communication use.

**THE COMMUNICATION SETTING: A DYAD**

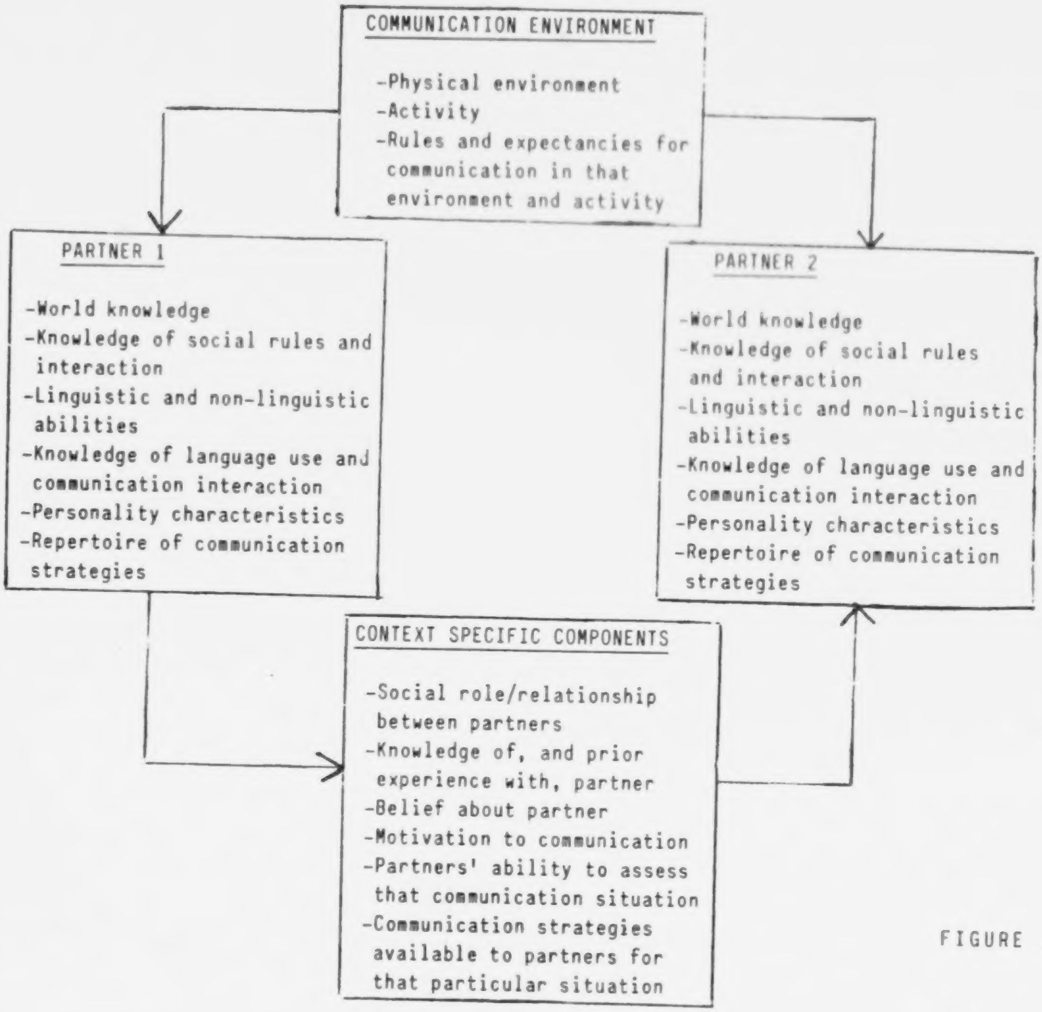
COMMUNICATION ENVIRONMENT
-Physical environment
-Activity
-Rules and expectancies for communication in that environment and activity
PARTNER 1
-World knowledge
-Knowledge of social rules and interaction
-Linguistic and non-linguistic abilities
-Knowledge of language use and communication interaction
-Personality characteristics
-Repertoire of communication strategies
PARTNER 2
-World knowledge
-Knowledge of social rules and interaction
-Linguistic and non-linguistic abilities
-Knowledge of language use and communication interaction
-Personality characteristics
-Repertoire of communication strategies
CONTEXT SPECIFIC COMPONENTS
-Social role/relationship between partners
-Knowledge of, and prior experience with, partner
-Belief about partner
-Motivation to communication
-Partners' ability to assess that communication situation
-Communication strategies available to partners for that particular situation

FIGURE 1.

The Partners Participants bring a host of abilities, experiences, social roles and expectancies to a communicative event. These in turn have an effect on the communicative interaction that does, or does not occur, and the language and non-verbal behaviors used by the participants. The status or social roles of the people involved in conversation in relation to each other have been identified as a regulating factor. Each person has a status in a given society (by age, sex, occupation, background). In addition, any two partners have a relative status role in relation to each other in a particular setting. The communication can be between teacher and student, parent and child, employer and employee, best friends or strangers. One member of the dyad may be more powerful by virtue of societal values, social role or the situation (e.g., one person has information or actions that the other person wants). At other times, the status may be more evenly distributed between the partners. These social and status roles influence language use. Some examples can be seen in the use of polite forms, vocabulary use and the directness with which requests are made. Females may use a higher percentage of question forms in making requests of males (Lakoff, 1979; Lynch, 1983). A child making a request of a parent or other authority figure may use very polite forms (Delia and Clark, 1977; Ervin-Tripp, 1977). In peer interactions, these same requests may be made in a more direct, demanding manner ("Gimme a cookie" vs. "I'm hungry. May I please have a cookie?").

In addition to the pre-established roles and power positions brought to a communication (e.g., adult-child, boss-worker) when any two people meet and interact, there are additional dynamics brought to the situation by the personality and social characteristics of the people involved. One partner may be more assertive than the other, or have a need to lead and be in control of the types and topics of interactions. Another may be non-assertive, or make an effort to have equal participation. The particular characteristics of each partner in the exchange, in relation to each other, obviously can effect the language use and conversational structure. It has also been suggested that we use language to help us establish various social roles and images (Argyle and Trower, 1979; Rees, 1982) which in turn shape interaction. Particular use of language can suggest dominance, deference, sex roles, politeness, etc., as perceived characteristics of the person using them.

The qualitative aspects of interaction also vary with the levels of familiarity between partners. The greater the degree of knowledge one has of a partner's abilities, style of communication, intended meanings of selected words and non-verbal behaviors, as well as their perspectives and experiences, the more efficiently and effectively communication can be constructed. One only has to observe communication between a man and woman married for 20 years, or a mother and an adult non-speaking son, to appreciate the differences that shared experience and knowledge impart. Communication between strangers or persons who know each other more peripherally are often qualitatively different, and open to greater misinterpretation. For example, a comment such as "I'm not really hungry" in response to a lunch invitation from someone who is a relative stranger is open for varied interpretations. Is the comment communicating shyness, a lack of hunger or a lack of desire to spend time with you? With a familiar friend the interpretation is more explicit. Familiarity also extends to shared experiences and knowledge about the topic of conversation. This too has an effect on what is said and how it is said. An acquaintance coming up to you in a grocery store saying, "I hear she is better," has some prior knowledge of the illness of a family member.

Communication partners also bring expectancies and attitudes about the abilities and knowledge of the other communication partners to a conversation. Expectancies are often based on physical appearance or the first few moments of a conversation. For example, an introduction to someone described as a psychotherapist, a professor or a feminist sets up various social roles, power roles and relational dynamics. A man with a beard, long hair and casual clothes may be expected to be liberal, politically and socially. An older person may be thought of as an uninteresting partner. These expectancies and attitudes effect our communication styles and interactions to a greater degree than we think with foreigners, young children, the aged, the handicapped and others with perceived differences (Comer and Piliavin, 1972; Ferguson, 1975; Heinemann et al, 1981; Rush, 1983).

Environments and Activities Conversational interaction occurs in a specific environment, e.g., a supermarket, a faculty meeting, a rock concert, a doctor's office, a family breakfast table, a date, a Thanksgiving dinner, a classroom activity. What one says and does to be appropriate is also dictated by communication and social rules of interaction for each of these situations. Conversation between two family members in a doctor's office may be more formal and less intimate than conversation with the same person over the breakfast table. The style of language used between friends at a rock concert may not be appropriate to a group discussion in the classroom or at the dinner table with the parents of one member of the group. Language use may also vary within different activities in an environment (Cook-Gumperz and Corsaro, 1977). For example, interaction styles may differ in the classroom given a formal teaching situation, a group project, snack time and the cafeteria. These situations normally vary with respect to when one talks, how one talks and the length of that interaction. Appropriate communication behavior is dependent on a knowledge of these differences and an ability to alter the use of language in order to accommodate them.

Language Sampling in Different Contexts In studying communicative interaction, the context and partners need to be considered and defined in understanding the behaviors that are observed. There can be very large discrepancies in a person's performance from one partner to another and from one context-topic to another. Labov (1970) was one of the first researchers to call these differences to our attention. In a classic study of the language skills of a group of first grade children in Harlem, he demonstrated discrepancies in language use in two different contexts. In one situation, these children were asked by a teacher to describe a particular picture. In a second context, a few of these children with low social status in the classroom were put in a room and left with a rabbit to take care of. The teacher-child context produced samples of language which reflected simplified use of language and patterns that were seen as deficient. The rabbit and peer situation, on the other hand, produced language which was highly interactive, rich and competent. The influence of partner and context on interaction patterns has also been demonstrated by other researchers studying "normal" children and adults (Gump, Schoggen and Redl, 1963; Snow, 1972; Cook-Gumperz and Corsaro, 1977; Cooper, 1979). Differences in language use across contexts and partners has also been demonstrated for persons with communication disorders, and between clinical and non-clinical environments (Bedrosian and Prutting, 1978; Andrews, UP-1980).

## The Communication Moves: The Use of Communication Conventions and Strategies in Interaction

The rules, or conventions, of communication use (e.g., linguistic, non-linguistic, discourse and social rules) provide a mechanism and a framework for the orderly transfer of meaning across partners and situations. Partners depend on each other's knowledge of these conventional acts and events, as well as each other's knowledge and recognition of procedures for entering into and sustaining mutual involvement to co-construct this interaction (Goffman, 1963).

Any interaction is a mixture of the use of communication conventions and the use of interaction strategies. According to Duncan and Fiske (1977), "interaction strategy is possible in part because of the degrees of freedom allowed by convention." These strategies are "describable in terms of the ways that individuals usually use these degrees of freedom." (p. 247) In most communication contexts, an individual has a wide range of freedom in expression. This flexibility is apparent in how something can be worded or communicated, when something is or is not said, and when speaking turns and signals will be responded to. The particular strategy used at any moment in conversational time is dependent on many factors. These include the speaker's personality characteristics, the communication partner and situation, the speaker's agenda or intentions (e.g., to get a person to believe or do something, to gain power or solidarity, to project a particular social identity), and the communicative exchanges that have occurred prior to an utterance or during an utterance.

Conceptually, one might liken "conventions" and "strategies" to elements in a game such as chess, poker or tennis. These games have specific pieces and rules for using them (e.g., the moves a pawn or knight can make; who is to serve the ball and from where). Each partner plays by the general rules and adds their individual strategies. These strategies are choices the player makes within the confines of the general rule structure, and from the options available at any given time. This strategy could be deciding which card to play, when to make a move, what non-verbal behaviors to project or not project, and with what attitude. Language form and content, and non-verbal behaviors might be viewed as the "pieces" or components in communication interaction. These language "pieces" are used according to a set of rules for the use of language in any given social and communication context. Added to these rules are communication strategies for when to use what, and how. These strategies are selected from a variety of communication options open to the user in any communicative situation. The particular strategy used in a given situation varies with the "speaker's" or "listener's" abilities, cultural style, personality and sex. They are also reflective of a person's perception of his or her communication partner.

The use of communication strategy can be illustrated by a person in an institutional setting wanting to communicate with a nurse in order to get an extra pillow. This request can be communicated to the nurse in a variety of ways: "Can I have an extra pillow?", "I want another pillow", "Get me a pillow", "When you have time, could you get me another pillow if it isn't too much trouble?" or "I'm having a hard time sleeping with only one pillow." These utterances vary in the use of politeness and directness. All are appropriate within the conventions of language use. Given knowledge about the nurse and how she might relate to each of these approaches, one strategy is selected based on the speaker's projection of what is needed in terms of getting the pillow, and establishing and maintaining a particular relationship with that nurse.

Communication strategies are not only based on the specific form selected for communication. They extend to the content and meaning of messages, the extent of one's participation, and how one enters, maintains and leaves conversations. For example, all of us have experienced a communication situation in which one partner dominates the conversation in an egocentric fashion. Faced with this situation, we develop strategies for handling the uneven discourse. This may be to "give up" and not try to make the participation even; it may be to develop a means to terminate the conversation; it may be to use strategies to interrupt and attempt to balance the power and participation. These choices are our degrees of freedom within the conventions of that interaction.

## The Bi-Directional and Interactive Nature of Conversation

Communication involves at least two people, and each of them influences the behavior of the other as conversation unfolds. What is said or done by a "speaker" at any point in an interaction is often the result of what was said and done by both partners in earlier segments of that exchange. That, in turn, influences the subsequent behaviors that occur. A question requiring a quick, single word answer may have been asked or information may have been requested or a teasing sequence begun. Particular information may have been previously shared by the partners. Consequently, the wording of an utterance may reflect what is already known and assumed, and what is new information (e.g., "I don't think we should take that to him").

Behavior that looks adequate or deficit in and of itself may appear quite different when placed within the rest of the communication that has and is occurring. It may be that one partner is very dominating and verbose, providing little opportunity for the other to "get a word in edgewise." That partner's minimal contributions to the conversation may be quite understandable when the behavior of the other partner is examined. It is also the case that behavior that appears to be syntactically and semantically adequate may be odd, inappropriate or out of place when examined in the overall context and in relation to what occurred prior to the utterance (Blank, Gessner and Esposito, 1979). Conversation is reactive as well as interactive. Subsequently, both sides of a communication interaction need to be examined to understand the behavior of any one of the participants.

Both partners in a conversation mutually influence each other continually, not only in a serial fashion but also through ongoing simultaneous behaviors which are bi-directional. Non-verbal signals are sent by the 'listener' back to the "speaker" during the production of an utterance or turn. This simultaneous behavior has been referred to as feedback, listener's within turn behavior, interaction signals and back-channelling (Duncan and Fiske, 1977; Payotos, 1980). These "listener" behaviors and their impact on what a person says and does are just beginning to be recognized as important to communication interaction process. Eye-gaze, body shifts, puzzled or emotional facial expressions, lack of an expression, head shakes on the part of the communication partner are "read" by the person "speaking". These in turn can have an affect on what is or is not said, how it is said and the subsequent utterances. The "speaker" can shift style as he or she perceives the "listener" to be reacting badly to a request; or become more explicit as he or she sees a puzzled look appear; or shift topic or begin to terminate the conversation perceiving that the partner is bored or inattentive; or misperceive a lack of interest from a lack of facial expression. It is also quite possible that a "speaker" can fail to attend to these "signals" when interacting with someone. Take, for example, the subtle but explicit signals we send when we have to rush and do not have the time to listen, or are bored with an interaction. These are signals that are often not "read" by our less sensitive partners, sometimes much to our dismay.

## CHAPTER III

## IMPLICATIONS OF AN INTERACTIONAL MODEL FOR STUDYING COMMUNICATION BETWEEN AID USERS AND OTHERS

### The Need for a Broad Perspective

Recent research, particularly in the area of pragmatics and communication science, has broadened our perspective of what "communication use" is, and what it encompasses. In our efforts to gain a greater understanding of the nature of communication interaction between users of communication technology and others, we need to take into account current thought and knowledge on interaction between able-bodied persons. In particular, we need to recognize the interactional effects of both partners on each other and on interaction. We need to include multiple modes of communication in our observations and understanding. We need to acknowledge the effects of partners and contexts on the behaviors we are seeing. And last, we need to broaden our view of communication to include a variety of communication, social and psychological purposes beyond the communication of basic needs and information.

In studying the use of a communication device by a child or an adult, it is of interest to know about variables such as what vocabulary or technical features of an aid are being used, the frequency of use, how quickly language elements are being communicated and what is being said to whom. It is also beneficial to observe changes in these parameters of aid use with training, development or a change in communication device. Although this gives us important information about the frequency of use of specific device characteristics and raw language data from the user, it affords very little insight about the interactions that are occurring in everyday situations and the nature of that process. By examining only one side of the communication exchange, that of the communication device user, only one half of the communication picture is visible.

The utterances and device characteristics that are used are highly influenced and often dependent on what communication partners are saying and doing in their interaction with device users. For example, the verbal partner in the conversation may not be giving the device user an opportunity to participate or may be asking questions that permit only yes/no responses. The verbal partner may take the communication turn away from the aid user after one or two words in reaction to the slow rate of communication that is occurring. What one partner in the exchange does affects what the other partner in the exchange does and can do; that partner, in turn, affects what the other partner in the exchange does and can do, and so on, in a continuous cyclic manner. This interaction is more than serial. During any speaker turn, continuous and simultaneous feedback information is being sent from the "listener". This simultaneous behavior, in turn, affects what the speaker does. To fully understand the communication behaviors of a device user in everyday contexts, one must look at the behaviors of all of the participants in the interaction and how they affect each other.

Communication between people is multi-modal as well as bi-directional. Data collected on augmented speakers needs to reflect this. The communication picture is incomplete if one only studies the utterances produced through a device. Again, this information is useful in understanding the linguistic or frequency aspects of device use. However, this data should not be used alone when attempting to understand or describe the communication exchange that occurs between augmented communicators and others. Device users and natural speakers rely on a variety of gestures, facial expressions, eye-gazes and body movements to convey specific information (e.g., pointing in the direction of an object or person to give reference, a head nod to show agreement with a statement or to give a social acknowledgement, or an arm movement to signal a desire to enter a conversation). In addition, many communication device users have dysarthric speech or a limited repertoire of words and phrases. Many paralinguistic aspects of speech and vocalization may also be available to enable the device user to get the attention of a partner and to convey meaning and intentions (e.g., the various ways the word "no" can be produced to effect multiple meanings by changing vocal pitch, duration or loudness). Non-verbal behaviors, speech and paralinguistic aspects of communication are used to convey meaning and regulate a conversational exchange, as well as device use. These behaviors must be integrated into our studies to enhance our understanding of the interactive process.

Interaction takes place in a variety of contexts and environments, with different communication partners and agendas. Any particular communication sample reflects the setting in which that interaction occurred. The interaction and language use patterns observed in one context may not be similar to another. This variance in communication performance has been documented with able-bodied speakers, and more recently in the research work on augmented communicators by Andrews (UP-1980), Calculator and Dolloghan (1982), and Kraat (UP-1979). One must be cautious in making broad statements about communication performance on the basis of the behaviors exhibited in any one context. Each context observed or studied needs to be carefully defined and interpreted within that setting. Over time we may gain a better perspective of the communication processes in augmented forms of interaction across contexts, communication demands and partners. Hopefully, this will enable us to begin to train aid users to interact effectively across this variability.

It is also important to recognize the various purposes that communication and interaction serve. In attempting to understand and study augmented and natural speakers, it is not enough to look only at the communication of language content between two or more people (e.g., various topics of conversation, ability to convey basic needs or ask questions). This information is highly important and critical to our understanding of communication in this population. However, we also need to broaden our view of what communication is in order to include some of the social purposes of communication interaction discussed earlier in this manuscript. It is equally important for one to acquire a feeling of belonging, to be able to reflect aspects of one's personality or to create and change others' perceptions of oneself as a person. These, too, are achieved through communication and interaction. Mostly, we need to gain a better understanding of what augmented speakers want to achieve through "talking" to others. With these purposes in mind, we can develop aid characteristics and communication strategies toward achieving these essential psycho-social goals.

## Some Differences Brought to an Interaction by Non-Speakers, their Partners and Non-Speech Modes

There are several potential areas of difference which can be outlined in a communication exchange between an augmented speaker and an able-bodied person using natural speech. These differences span multiple dimensions of the interactional process from the reduced potentials inherent in augmented modes of communication (i.e., a particular communication device, set of non-verbal behaviors, and limited speech or vocalization); to the multiple non-verbal movements that a person with ataxia or athetosis might make which are not intended to be communicative; to the inferencing that an able-bodied person is or is not able to make from a partner who may not be sending traditional signals upon which this inferencing is usually based; to the communication "moves" that can be made when and how; to the physical distancing between communication partners when one is sitting in a wheelchair or is in a stationary position. In order to understand the nature and quality of human interaction between people when one partner is an augmented speaker, these differences and their impact need to be acknowledged.

The Modes The augmented speaker has multiple modes of communication through which to interact. These include vocalization, dysarthric speech, eye-looking and pointing, body tone changes, arm movements and gestures, and facial expression. In addition to non-verbal and vocal modes of communication, many augmented speakers have one or more communication devices available to them. These communication aids vary widely with regard to the vocabulary and syntax that is available, the rate at which any utterance can be produced, the impressions that are projected by the physical characteristics of the aid, where the communication partner must be, and what the partner must do to receive a communication effort (e.g., visually note a sentence communication one letter at a time, or watch words appear on a video screen at the foot of a bed).

Each augmented communicator has a specific repertoire of communication modes through which to interact and communicate. Non-verbal behaviors which are available to able-bodied persons may be partially present, limited to a few behaviors or altered in the augmented communicator. This person may not be able to show gradations of a smile, may have a flaccid facial expression due to weakness, may or may not be able to control his body posturing, may be unable to maintain eye contact with a partner for an extended time period due to reflex patterns or weakness, or may not be able to raise an arm to point to a referent or to regulate an aspect of discourse. Movement disorders may produce movements of the face, head, body and limbs that are not meant to be communicative, but may have communicative meaning to the communication partner who interprets them as if they were used by able-bodied children and adults. The traditional signals transmitted through non-verbal modes to initiate, maintain or terminate an interaction, may be missing, altered or miscommunicated in communication turns and feedback to the partner (Higginbotham and Yoder, 1982; Morris, 1981). The impact of the lack of non-verbal signals, or altered signals, on communication has been documented in the studies of blind children, cross-cultural communication and communication impairments (Byers and Byers, 1972; Frailberg, 1974, 1979; Mirenda, Donnellan and Yoder, 1983; Preisler, 1983). Although the impact of altered non-verbal signals on interaction between augmentative aid users and others has not been systematically studied to date, it is probable that these differences do have an effect on that interaction process. Further study is needed to determine the exact nature of that relationship and its importance.

Each augmented communicator not only has a specific repertoire of non-verbal signals and behaviors, but may bring a specific communication device into the interaction process. Again, the characteristics of a particular device define that user's potential in terms of vocabulary, rate of communication and the modes through which that participation can take place. A user may have 50, 100 or 350 symbols available or may have spelling capability. What and how something can be communicated differs by the amount of vocabulary and the specific vocabulary available to the user in that situation. Communication may be attempted through one or two words or a complete sentence. The user's physical ability combined with the communication device characteristics may allow the user to create messages at two words a minute, 15 words a minute or at a much more rapid rate by using stored sentences. Very slow or more rapid communication, with unlimited or restricted vocabulary, is conveyed to a communication partner through the media available in a specific communication aid. For some augmented speakers, this may be pointing to picture symbols with a headpointer or lightbeam; for others, messages are transferred through panels that light up written words or alphabet letters, or by the listener noticing the numbers of a code pointed to with the eyes. Other users of communication technology may be using more advanced systems in which messages can be displayed on a screen or video monitor, printed on paper and/or spoken in synthetic speech. These modes of communication are very different from rapid, natural speech in which the communicator has immediate access to any vocabulary known to them. As a field we are aware of many of the differences and limitations of these alternative communication systems (Yoder and Kraat, 1983; Kraat, 1982; Shane, Lipschultz and Shane, 1982; Vanderheiden, 1984; Harris and Vanderheiden, 1980; Harris, 1982; Foulds, 1980). However, we are only beginning to study the differential effects of specific device characteristics on the interactional process.

In many ways, the particular non-verbal, vocal and device potentials that an augmented speaker has determine the types of communication that are possible and available for any communication situation. This repertoire also defines the communicative participations that will be possible and successful, and impossible or difficult with a particular partner in a given situation. These collective modes are the forms and "pieces" that the augmented speaker has available to communicate with. What that speaker decides to use, and in what ways, is partially dictated by the rules for language use in context. However, these must necessarily be modified given the constraints and unique forms available for communication. The augmented speaker must decide which strategy and combination of modes he or she can use to accomplish a particular communication purpose from the available forms. The communication partner who is able-bodied and talking is placed in a communication situation with someone using very different modes for communication. This has an effect on their participation and communication "moves" as well. Given these differences, the study of communicative interaction between augmented and natural speakers addresses how these people adapt to one another, negotiate meaning and co-constuct a conversation.

Language Knowledge and Patterns of Use The models and rules for language use surrounding any augmentative aid user are those used by able-bodied, talking persons. These models and rules may or may not be effectively transposed to augmentative system use. The ways in which a natural speaker convinces, pleads, jokes, shocks, politely requests, dominates, interupts, expresses anger, shows an allegience and comradery, may be impossible or impractical for the augmented communicator. Given limited non-verbal skills and a different mode of communication, the manner in which an able-bodied speaker handles discourse structure, begins a conversation, keeps an interaction going, or introduces and elaborates on topics, may or may not be possible or effective for the augmented communicator. The rules of language use in speech may not apply as well to augmentative device use. One need only think of the cost in communication time and the patience needed by a partner to enable an aid user to express an elaborate form of a polite request such as, "I really don't want you to do this if you don't want to. I'll understand it if you say no. But, I would like to borrow your new record album for a half hour to play it for Joey ...." This polite form is not easily translated through a text to speech device where each word is spelled out in a character every two seconds, taking six minutes. Indeed, with these time constraints, the request could hardly even be considered polite.

Although the augmented speaker may have adequate knowledge of the language code (linguistic and non-linguistic), and the rules for language use for a particular social/communication situation, that speaker may either not have the means available through which to apply this knowledge in a conventional way or for the sake of efficiency or effectiveness, may chose not to apply it. For example, a child may have knowledge about shifting speaking styles when talking about watching television to different people, in different contexts: a teacher, a grandparent, a best friend, at school or at home in the den. That child may have little flexibility available in the vocabulary array of his augmentative system to speak to each of these people in a different way (e.g., only the words I/you/want/watch/T.V.). Yet, if he could speak, he might vary his utterances to fit his personality and social role. He might use such utterances as, "Let's watch your favorite team lose!", "The Hill Street Blues were out-of-sight last night", or "What's on tonight?"

In some situations, the aid user may have access to the particular vocabulary that others' use, but may choose to speed up the interaction by using alternate modes. Take the following sample from Silverman, McNaughton and Kates, (1978):

> Friend: "Halloween. What are you going to be?"
> Blissboard User: "B. Man."
> Friend: "Yeah, I could have guessed ....Hey, you know they took Batman off the air?"
> Blissboard User: Vocalizes, bangs his fist and points in the direction of the bulletin board.
> Friend: (Reads letter on the board from Joey and a friend protesting Batman going off the air) "That's beautiful, Joe!"

In this situation, the augmented speaker chose to use a variety of modes and physical material in the immediate environment to communicate meaningfully with his friend. A talking partner may have responded to the friend's inquiry with something like, "Yeah ...Carrie and I were really mad about that, and wrote the station a letter. We told them to keep him on the air!" Although the Blissboard user could have tried to convey the message linguistically, he selected a quicker and more effective means with his friend.

In attempting to understand and train communication interaction with augmentative systems, it is important to recognize that the person's performance may not be indicative of their knowledge of language use in context. The productive aspects of communicating are highly affected by the available vocabulary, the differences between natural speech and another communication medium, and the user's strategies for circumventing these differences in an effort to be effective and efficient. It may well be the case that traditional rules of language use are not necessarily appropriate for this augmented form of communication, and that altered rules need to be defined.

The Communication Partner The communication partner may be a stranger, a peer, a professor, a husband or mother, an attendant at school, or an acquaintance in the apartment building. This natural speaker brings to the interaction an ability to use conventional modes, forms and rules for an interaction, and his or her own particular interaction style. The nature of the interaction that takes place with any given augmentative communicator is based on how that person can adapt to, and communicate with, a "different" speaker. Of particular importance is his or her ability to understand and react to the augmented speaker's ideosyncratic signals, non-communicative body movements and messages formulated through that user's communication device. In these exchanges, past experiences, shared knowledge and knowledge of the non-speaker are invaluable in "reading" signals, selecting and expanding on topics, and co-constructing a meaningful interchange.

In each interaction, a person also brings beliefs and attitudes about people who are physically disabled, in wheelchairs, physically different, and communicatively impaired. They also bring specific attitudes and beliefs about the particular augmentative aid user with whom they are communicating. These attitudes and beliefs vary with people and partners. They have an impact on the communication that does and does not occur, as well as on the characteristics of that process.

To understand interaction from a social or communicative frame of reference, one needs to examine the attitudes, expectancies and beliefs of each partner. Michael Ward (1983) gives us the following glimpse of the impact of physical disability on communication expectancies:

> "Have you ever noticed what able-bodied adolescents do for socialization? Among other things, they spend a great deal of time "throwing the bull", "hanging out", and generally "rapping" about their culture and fitting into the adult world. Have you ever noticed what severely physically handicapped adolescents do for socialization - or, should I say, what able-bodied people organize for them to do? These young people play board games, engage in arts and crafts activities ...." (p. 234)

To understand how these attitudes and expectancies postively and negatively affect interaction and development is essential. This knowledge gives us a genuine opportunity for change through advocacy, training procedures and aid design.

Persons using devices have reported many experiences in which they are viewed as inferior, in terms of intelligence, ability and overall worth as a communication and social partner (Creech, 1981; Rush, 1983; Viggiano, 1981). These perceptions are reflected in behaviors such as partners virtually shouting at a non-speaker, asking others questions that should be addressed to the aid user, talking to a non-speaker as if he or she were a young child, and having low expectancies for the participation of non-speakers. Faced with an unfamiliar situation and an uneasiness about how to interact, potential partners may choose not to interact (Richardson, 1969). To date, we have very little information about attitudes toward various communication device users and how these affect communication exchanges and opportunities. However, it is suspected that the nature of many of the conversations that take place are influenced by these beliefs.

Social psychologists and other researchers have examined attitudes toward physical disabilities in a variety of age and socio-economic groups, as well as the impact of physical disability (usually a limb impairment) on a variety of conversational parameters: non-verbal behaviors, the length of a conversation, the topics that may or may not be discussed, and the manner in which they are talked about (Zola, 1981; Elsberry, 1973; Kleck, 1968; Kleck, Ono and Hastorf, 1966; Davis, 1961; Brown, 1981). Although these studies do not specifically address communication device users, they project differences in communication interactions when one partner is speaking, but from a wheelchair. As many augmentative communication device users are physically disabled and in wheelchairs, these studies are of interest.

The findings suggest that persons with severe physical disability are ranked very low on scales of attitude regarding potential friendship and capabilities when compared to other types of physical disabilities, sensory loss and cultural differences. These attitudes may vary across age, personality characteristics, self-image and socio-economic status, and may or may not change with greater social contact with a specific person. Able-bodied persons reported feeling uncertainty and uneasiness about interacting with a person with a physical disability, and expressed concern about what was appropriate given this unfamiliar situation. In general, the communication interactions studied were overcontrolled, inhibited and reflected stereotyped images of the physically disabled. The length of the interactions were shorter than between two able-bodied persons. Facial and body movements that usually occur during conversation were lessened. The topics selected for discussion were controlled and projected stereotyped images of disability; able-bodied partners altered the way in which they spoke about topics such as physical beauty, dating, sports or discussions of religion (e.g., the assumptions were that disabled persons are more religious).

The Partner Using Augmentative Modes of Communication Goffman in his classic book on stigma (1963) postulates that both partners in an interaction between the "stigmatized and the unstigmatized" are under stress, not just the able-bodied person. The person who is disabled may also be uneasy, unsure and self-conscious about the impression that he or she is making, or uncertain about what communication moves to make with a variety of speaking partners or what the social roles are in that particular situation. That same augmentative speaker brings to the interaction his expectancies of what the "normal" partner is thinking and is capable of.

In 1972, Comer and Piliavin researched the other side of the dyad, i.e. the physically disabled partner's interaction patterns with other disabled vs. able-bodied persons. In a study of communication differences in interactions between men with limb impairments and strangers who did or did not have a similiar impairment, persons with physical disabilities were found to exhibit some of the same behaviors seen between able-bodied and disabled speakers when the focus of the research was on the able-bodied person's behaviors. That is, they interacted for a shorter time period with the able-bodied partner, had less eye-contact and body movment, and monitored topics of conversation. It is the case that most studies of interaction have focused on the able-bodied person and that person's effect on the augmented speaker. It seems appropriate to look at the beliefs and attitudes that the communication device user has about him or herself, and also about the "talking" partner. Of interest is how these very human factors impact on the device user's behavior as an initiator of a conversational sequence, and further, on what is said, when it is said and how it is said.

Several researchers and observers have suggested that children with developmental conditions resulting in severe communication impairments and physical disability may have reduced social, communicative and cognitive experiences and therefore limitations (Richardson, 1969; Shere and Kastenbaum, 1966; Harris and Vanderheiden, 1980; Morris 1981; Yoder and Kraat, 1982; Shere, 1956; Bricker and Lewis, 1982; Carlson, 1982; Duncan, Sbardellati, Maheady and Sainto, 1981; Bottorf and DePape, 1982; Higgenbothan and Yoder, 1982). Obviously, not all developmentally disabled children have an impoverished experience base or reduced abilities in these areas. However, from an early age, severe physical limitation does affect independent and joint exploration of objects and actions, and the ability to give readable interactive signals. Whether or not caregivers and others recognize the need to provide information and experiences in contexts in which the child is not the person providing the overt stimuli and motivation to do so, may affect the social and cognitive development of that child. Since verbal speech is also limited by the physical disability, it is unable to serve as an alternate means of inquiry, exploration and interaction.

In their study of 13 mother-child interactions with severely physically impaired children in the natural environment, Shere and Kastenbaum (1966) highlight the reduced stimulation that can occur. Interaction in one dyad was limited to daily care activities with actions that were inhibitory to development and growth. The child in that dyad was found to be passive and failed to manifest an interest in objects or to initiate acts of communication. In a second dyad, the mother provided a greater breadth of experiences verbally, but focused much of her interaction with objects and actions on motor training goals (e.g., placing it out of reach to stimulate physical reaching).

Richardson (1969) observes that disabled children have few opportunities to play and interact with people outside of their immediate family or environment, and suggests that this may affect social development. Children initially are involved in mandatory social relationships with family and caregivers. However, as they develop, children and adolescents move outward into voluntary social relationships with a variety of people. In these voluntary relationships, the rules for the relationship and the interaction differ from the earlier, more protective, mandatory ones. Richardson suggests that disabled children are often kept in mandatory relationships for a long period of time with little experience and exposure beyond interactions with a few people. Other potential differences in communication and social growth are outlined by Shere (1956) in her study of twins with cerebral palsy. Her study illustrates how families may treat a disabled child differently, e.g., giving them less responsibility, expecting less or giving them improper and non-normative feedback for their efforts. She suggests that these differences may too impinge on development.

Language and language use are learned during interaction. They may be limited by a lack of social and communication experiences with a wide variety of people and in varied contexts. Expressive communication skills may be further reduced by the particular communication patterns of parents and caregivers. The child may be surrounded by people who do not "read" and respond to his/her idiosyncratic signals. Or they may interact with the child by anticipation and "Twenty Questions", in which case the child is not expected or allowed to be an active participant. Such patterns are often established well before the introduction of a communication device and, out of habit, may tend to persist long after they are necessary or appropriate. In examining interaction, it is important to emphasize that a child given a communication device and the language pieces for expression may or may not have the social and communicative experience necessary to optimize this potential.

Proxemics and Use of Non-Linguistic Context In conversation the speaker and listener generally face each other. This orientation is conventional and allows both participants to view each other's non-verbal behaviors and make eye contact. In most cases in which there is extended conversation, partners are at the same eye level (e.g., around a table, standing together) and within distances of each other that suit the intimacy of the situation (e.g., at arm's length, side by side). Some conversational exchanges, usually brief, may be made at wider distances or at uneven eye-levels (e.g., asking a quick question, exchanging social greetings, etc.).

The person using augmentative communication means is often sitting in a wheelchair at chair height, and may or may not have independent mobility to alter distance and orientation toward a partner. This may be further complicated by reflex patterning, and/or the position that a "listener" must take to communicate with that person, given the characteristics of a particular communication device. Receiving linguistic communications from an augmented speaker may require the "listener" to stand very close to the "speaker" -- behind, next to or directly in front of them. In conversations between able-bodied people, this close distancing between interactants is usually reserved for interactions that are intimate, private, between good friends, and/or with young children. Beukelman and

Yorkson (1984) have suggested that communication systems that require this close physical distancing may be inhibitory to interaction with strangers and those less intimately related to the user. The disabled person in a wheelchair is often spoken to while an able-bodied person stands. These uneven postures appear to affect role and status/power relationships in able-bodied partners (Higgenbotham and Yoder, 1982), and may impact on how the aid user or able-bodied person see themselves in relation to each other. One must also recognize the impact of the lack of mobility on the part of a person using a communication system. That person's ability to move into conversational space in a group, or with another person, is restricted. When the user does not have independent mobility, communication partners must come to the person using an augmentative system in order to have a conversation. The system cannot project over distance. These differences in the proxemic aspects of conversational interaction have been noted. Their specific effect on interaction with aid users remains to be studied.

Children and adults regularly integrate physical objects and actions into their communicative behavior with others. For example, an able-bodied child may hold up a toy helicopter and initiate a conversation of a topics by saying "broken"; an adult can open the top of a computer, point to port opening #6, and say, "It goes here." Referents and topics are frequently marked by physical manipulation, showing, and pointing, and appropriately altered language use. These physical supports are not generally available to an augmented speaker. The child or adult using a communication aid may have to convey this information totally through the vocabulary and language used. Again, this difference has been observed and acknowledged, but its impact on the interaction that does or does not take place is poorly understood.

## The Interactional Process

It is probable that interactions between technical aid users and others have many similarities to interactions between speaking partners. For example, an adult using an alphabet board may be using conventional syntax and vocabulary in an utterance, providing feedback to his partner with facial expression, and transferring speaker-listener roles back and forth with his partner in traditional discourse fashion. It is also probable that there are many novel features to these interactions, given the unique characteristics and limitations inherent in the communication modes available to any augmented speaker.

The talking communication partner may not be receiving the traditional linguistic and interaction signals used as a basis for communication and conversation. This can lead to misunderstanding and a series of adaptive behaviors for the situation that may or may not be helpful to the communication process. The augmented speaker may have vocabulary restrictions in the communication device, or unique ways to construct vocabulary (e.g., Blissymbolic strategies). He/she may have a slow rate of message construction, and/or an inability to use traditional non-verbal signals to convey meaning, provide feedback and regulate discourse. These differences effect the non-speaker's abilities as a conventional message sender and message receiver. It is also often the case that the vocal partner needs to become actively involved in the construction of the augmented speaker's message (Harris, 1982). This involvement may be to expand an aid user's message when the vocabulary is not fully available, to further clarify a communicative intent of a short utterance created by the aid user in an attempt to save time or to actively participate in the production of the message by repeating the letters or symbols pointed to. This involvement of the "listener" in the speaker's message does not follow traditional speaker-listener roles. This modified listener role can serve as the basis for message interference by the communication partner. Clearly these unique differences alter the flow and balance of conversation.

Conversational exchanges between aid users and others might be viewed as the study of how two or more people actively solve pragmatic problems with these unique modes of communication. Both partners are faced with a communication situation in which they need to co-construct meaning and participate with a distinctly different communication medium. The effort to do so creates a unique communication exchange. With the modes and means available, and given a communication partner and a particular communication situation, the augmented communicator attempts to make communicative moves to convey an intended meaning, to influence the other person in some manner and react to his partner's "moves". The communicative task may be making a request of a stranger, trying to get into a group conversation, attempting to change a listener's social perception of the speaker, trying to take a strong position on a financial matter with a spouse, contributing information on the job or just enjoying the experience of socially "hanging-out". In so doing, the augmented communicator must select strategies from among those available to try to achieve his or her purposes. The verbal partner, too, has an agenda and a set of strategies for co-constructing a communicative exchange with an aid user and for responding to an aid user's "moves". The efficiency and success of that interchange is dependent on the forms available and the communicative strategies selected by both partners in the interaction.

Because of the differences in the modes used for communicating by physically disabled "speakers", it is particularly important to separate the user's knowledge from his/her performance. We need to recognize the influence of what is available, efficient and effective in a particular situation to understand the interactions that occur. The communication behaviors exhibited are a result of: (1) that person's knowledge about language form and content ("the pieces"); (2) that person's knowledge about the rules for language use from a communication and social perspective; (3) the performance capability of an augmentative system to execute what is known about language and language use; (4) the communication strategies that are in the repertoire of that person for responding to that situation; and (5) the user's perception regarding the impact of the specific strategies selected from the available choices. Items 3-5 are unique in augmented speakers and communication technology. Each of these components needs to be examined and understood in relation to any aid user's performance when interacting with others in a variety of settings.

Cultural Considerations It is also important to acknowledge that information obtained from observations and empirical study of communicative interactions between aid users and others in one culture or sub-culture must be interpreted with caution in another culture. The constraints and characteristics of communication via a specific device, or particular set of non-verbal behaviors, may vary greatly from one culture to another. For example, a slow rate of speech or silence during an interaction may not have the same effect on the behaviors of communication partners in some cultures. Physical difference and disability may not be as socially devalued in one culture as they are in another. Such factors will impact differently on the exchanges that are possible, as well as on the levels of those exchanges. Devices that appear highly technical may be viewed and reacted to differently in various societies. The quality of synthetic speech may be more negatively perceived in a country where speech and voice characteristics are highly correlated with social roles. Or, alterations in eye-gaze behavior, facial expressions or limb movements may not have as detrimental an effect, given the discourse structure in one culture versus another. In our efforts to understand the nature of communicative exchange in augmented speakers, we need to be cautious in transposing the research results from one culture to another.

## Augmented Interaction: A View From a Normal or Adapted Model of Communication Interaction

The interaction and interactional patterns between aid users and others can be examined against the normative model for verbal interaction in a particular culture or sub-culture, or an adapted model for that particular type of interaction. The particular model used will depend on the questions asked and the researcher's view of augmentative communication. However, depending on the model used to contrast or compare the behaviors of augmented communicators, different information and profiles will emerge.

It should be very apparent that augmentative communication modes available to the physically disabled do not parallel the speech and non-verbal behaviors of able-bodied children and adults. Therefore, when the communication performance of aid users is compared to that of verbal communicators in a conversational exchange, it obviously appears to be deficient. This may not be a productive avenue and model through which to understand augmentative communicators and the process by which they accomplish their interactions. What is learned is how impaired the augmented communicator is in contrast to his or her verbal partner in verbal world, what he or she does and does not do that normal speakers do, and the degree of difference that exists across a series of communication measures.

Several professionals (Personal communication - Yoder, Kraat, Higginbotham, Preisler, McNaughton, Laikko, Buzolich) have suggested that rather than postulating a deficit model of augmentative communication, it should be studied in a more positive manner. Within this conceptual framework, one can study how augmented speakers accomplish what they do accomplish in conversation given the constraints inherent in the productive capabilities of aided systems. This focuses our attention on the advances that can and have been made with increased communication options and training. A study of how various aspects of communication are negotiated and accomplished with aided systems is also likely to provide us with greater insights about the nature of the communication process in this unique medium of exchange.

This author and others (Yoder and Kraat, 1983; Harris, 1982; personal communication - Yorkston, Mariner, Yoder, Buzolich) have recently begun to question the use of a normal conversational model for non-verbal people, and have suggested that augmentative interaction and aid use might better be viewed through an adaptation of the model outlined for verbal conversational exchanges among natural speakers. This will be discussed further later in this report. This adapted model would reflect the unique ways in which conversation is constructed and exchanged between communication aid users and others. It would highlight the communication competencies that can be achieved within these modes, or with a particular set of device and user characteristics. An adapted model would provide a conceptual view of augmentative communication as different, rather than as deficient, behavior.

# CHAPTER IV

# OUR CURRENT KNOWLEDGE BASE ON INTERACTION BETWEEN AIDED COMMUNICATORS AND OTHERS

## The Sources of Our Information

We are neophytes in our understanding of communicative interaction between speakers who use augmentative communication devices and others. This is partly due to the fact that augmentative communication is a relatively new field of habilitation and rehabilitation. It also reflects our previous assumption that effective use would somehow follow the provision of a communication device. We did not think about what was or was not happening outside of our offices, laboratories and clinics. The non-speaker was provided with a device through which to speak, given a vocabulary and trained in the symbol set, syntax and device operation. Given this "voice", the disabled speaker was expected to compete and talk in the conversational arena. We did not realize that more than a device and language knowledge was needed, and that conversational interaction through these unique modes might need special training.

Deborah Harris (1978) was the first researcher to examine communication exchanges between aid users and others in the natural environment. In her doctoral dissertation, she studied the communicative interactions of three children using electronic communication devices (AutoComs) and their teacher during free time, individualized instruction and small group discussions. The results were quite unexpected. The children used their advanced aids minimally, rarely interacted with peers, infrequently initiated exchanges and communicated primarily through one word responses and non-verbal behaviors. By themselves, the advanced aids had not provided increased levels of communication for these children in the classroom setting. This realization stimulated further observation and study about how well augmented communicators were actually doing while conversing in natural settings. We began to explore some of the possible reasons for the under-utilization of these devices.

In the six years following the Harris dissertation, more children and adults have received a variety of communication aids. This has afforded us an opportunity to further observe the communication successes and difficulties that occur in applying these aids. Additionally, a few researchers have become interested in taking a more controlled and quantified look at the communication processes and differences inherent in this type of communication. However, to date, the information still remains sparse. Our current knowledge base includes only a handful of research studies and some published observations on interaction and aid use by users and professionals.

To date, 11 published studies that provide some empirical data about aid use and/or interaction between physically disabled, non-speakers and others have been identified (Shere and Kastenbaum, 1966; Beukelman and Yorkston, 1980; Calculator and Dollaghan, 1982; Calculator and Luchko, 1983; Harris, 1978, 1982; Beukelman and Yorkston, 1982; James, 1983; Silverman, Kates and McNaughton, 1978; Colquhoun, McNaughton and Izzard, 1982; Harris, Lippert, Yoder and Vanderheiden, 1979; Beukelman, D., Yorkston, K., Poblete, M. and Naranjo, C., 1984). Half of this small body of research has focused on aid and symbol use by the augmented communicator outside of an interactional framework. That is, these researchers have studied one side of the conversation -- the communication behaviors of the aid user -- without simultaneously examining the communication behaviors of the people they are speaking with and their influence on the aid user's utterances. Consequently, although the information is interesting in terms of the symbols and words used, the grammatical form, the number of opportunities, the number of communication partners and the aided speaker's behavior when communication is misunderstood (Silverman et al, 1982), it is limited to only one of the partners in the communication interaction.

Five of the studies (Shere and Kastenbaum, 1966; Harris, 1978, 1982; Calculator and Luchko, 1983; Calculator and Dollaghan, 1982; and Beukelman and Yorkston, 1980, case 2) address conversation and communication within an interactional frame to some degree. These five studies provide us with an initial information base on which to begin to understand the interactional process. This data base includes the study of 12 augmented speakers (2 with acquired conditions; 10 with developmental disabilities) who use a variety of augmentative systems. The contexts studied vary widely as do the communication partners involved (i.e., teachers, speech-languge pathologists, attendants, spouse). The relatively early work of Shere and Kastenbaum (1966) does not include communication aid users, but provides us with rich information about the early interaction and communication patterns between severely disabled, non-speaking children (2.6 to 4.8 years) and their mothers. Their informative research with 13 mother-child dyads over a 7 to 8 month period is very relevant to the study of communicative interaction between non-speakers, with and without devices, and their partners.

Professionals working with augmented communicators, children and adults using these systems, researchers and those who interact daily with severely speech-impaired individuals are also a rich source of information about the nature of communication exchanges that occur. They have observed the advantages as well as the problems associated with these new capabilities. Many of these people have shared their perspectives and observations through various publications (Beukelman and Yorkston, 1982, 1984; Bolton and Dashiell, 1984; Bottorf and De Pape, 1982; Harris, 1982; Harris and Vanderheiden, 1980; Higginbotham and Yoder, 1982; Kraat, 1982, 1984; Light, 1984; Mills and Higgins, 1984; Morris, 1981; Mott, 1973; Newell, 1984; Shane and Cohen, 1981; Shane, Lipschultz and Shane, 1982; James, 1982; Yoder, 1983; Rush, 1983; Blau, 1983; Creech, 1981; Turner, 1981; Calculator, 1984; Tew, Davies and Fletcher, 1980; Verburg, 1984; Vanderheiden, 1983, 1984; Yoder and Kraat, 1982). These observations and opinions broaden our perspectives on communicative interaction between those using technical aids and others, and serve as an important source of information for future empirical research.

In 1982-83, the International Project on Communication Aids for the Speech-Impaired (IPCAS) recognized the need to accumulate additional international information on aid use and communicative interaction, and therefore facilitated this study. As a result of this IPCAS project, several additional unpublished and in-progress studies relating to communicative interaction between aided speakers and others have been identified and collected. Forty-eight of these unpublished and in-progress studies have been abstracted and included in this report (see Appendices). These unpublished studies significantly increase our knowledge base and broaden our current understanding of this special form of communication exchange. Through active dialogue with professionals, researchers, aid users, parents, spouses and others, this IPCAS project has also enabled our observational base to expand. Participants have shared clinical log books, videotapes and diaries to supplement our impressions about the use of aids in conversation. This international sharing adds much to our perspective of the current state of the art.

## Formal Studies: What Interactions Have We Been Studying?

Table 1 provides a summary overview of the augmented speakers, their partners and the contexts examined in 36 research studies that addressed communication interaction within an interpersonal framework (i.e., both partners). These include published and unpublished studies and in-progress materials. In reviewing these studies, it is obvious that a variety of aid users, partners and contexts have been studied. Table 1 appears at the end of this chapter (see page 55).

The Augmented Speakers    A large percentage of the more than 110 augmentative communicators who have been studied are children and young adults with severe speech impairments due to cerebral palsy. These augmented speakers are between 2 and 28 years of age. Fewer studies have been conducted on the interactions of aid users with developmental disabilities or acquired non-speaking conditions who are over the age of 30. To date, only five adults with acquired conditions have been studied in interaction with their partners (Beukelman and Yorkston, case 2, 1980; Calculator and Luchko, 1983; Kraat, UP-1979; Lossing, UP-1981) One additional interaction study that includes persons with acquired conditions is currently in progress (Yorkston, Beukelman and Marriner, IP). Consequently, much of our current information about communication interaction with users of technical aids is based on persons with developmental disabilities who are under the age of 28.

These augmented communicators vary widely not only in age, but in language and cognitive skills, physical abilities, mobility and speech abilities. The particular communication devices used by these individuals also differs. A large percentage of the interaction studies have been conducted on persons who were using non-electronic, direct selection devices. These systems were primarily alphabet boards, alphabet plus word/phrase boards, Blissymbol boards, or a mixture of Blissymbol and picture boards. A few studies have included users of electronic communication systems which rely on a direct selection technique (e.g., Auto-Com; Canon; HandiVoice 110).

Although most studies involve augmented communicators with direct selection systems, there have been studies of users of coded and scanning devices. The coded systems reported include the use of Etran boards, number-color coding through direct selection of a code, and the HandiVoice 120, an electronic device which uses a three number code for language entries. Persons using coded systems have been studied by Andrews, (UP-1980); Bailey and Shane, (UP-1983); Blackstone and Cassatt, (IP); Buzolich, (UP-1982, 1983); Light, (IP); Lossing, (UP-1981). There have been few interaction studies on persons using scanning type systems, non-electronic or electronic. In Beukelman and Yorkston's 1980 study, one subject used a scanning unit (Zygo 100). Blackstone and Cassatt (IP) also report the use of a Zygo 100 and Morse Code unit. Since most of our current information is based on observational study of persons using direct selection techniques, this must also be kept in mind when we interpret these findings. It should also be noted that many of the users studied did not have spelling capabilities and were using restricted vocabulary systems in order to communicate.

Included in this report are a few studies of children and young adults interacting and communicating without a technical aid (Shere and Kastenbaum, 1966; Wexler et al, UP-1983; Weiner and Kornet, UP-1983). However, the subjects in these studies are physically disabled and severely speech impaired. In these cases, the interactions were accomplished through the non-verbal and verbal/vocalization abilities available to the limited communicator. They are included here in order to gain a better understanding of communication without an augmentative device.

Able-bodied persons with normal speech have also been used to study the interaction patterns produced when a technical aid is introduced (Farrier, Yorkston, Beukelman and Marriner, IP; Marriner, IP; Coxon and Laikko, UP-1983; student projects under David Yoder at the University of Wisconsin-Madison; Weeks, Kelly and Chapanis, 1974; Ochsman and Chapanis, 1974; Kelly and Chapanis, 1977). In these research projects, able-bodied persons are required to interact with others using specific technical aids and non-verbal behaviors. These studies allow the researchers to control the language and various non-verbal abilities of the user and to concentrate on the effects of particular augmentative systems on attitudes and interaction. The relationship between findings on these interactional studies with able-bodied users of technical aids and the interaction of actual users of this technology needs to be defined.

The Partners and Contexts Communication interaction between aided speakers and others has been studied in a variety of contexts.

Several researchers have chosen to observe interaction in the natural environments of the aid user (Beukelman and Yorkston, 1980; Harris, 1978, 1982; Calculator and Luchko, 1983; Calculator and Dollaghan, 1982; Shere and Kastenbaum, 1966; Andrews, UP-1980; Barker and Henderson IP; Beuttemeirer, UP-1983; Kraat, UP-1979; Lewis and Ripich, UP-1983). These studies have brought researchers into everyday environments to observe interaction in the classroom, institutional environments and the home, and during therapy sessions. In these contexts, the communication partners may be "open" and the results contingent upon the natural course of communication events. Or, a specific communication partner, such as a teacher providing one-to-one instruction, may be examined. The potential interaction may be part of a group experience, or a dyad. These environments provide an opportunity to look at interaction with housemates (e.g., other persons living in an institution), classmates and siblings as well as caregivers and other adults.

Other interaction studies have chosen to sample communication exchange in an artificial situation, where two people are asked to converse with each other. These conversations may be open-ended with no structure provided by the researchers, or be structured by the topic or the materials provided. An example of the latter can be found in a study in which aid users were asked to come to a videotaping session with three topics to discuss with their partner (Wexler et al, UP-1983); in a study in which the aid user was asked to discuss a movie, or give card game instructions to a partner (Morningstar, UP-1981); and one in which specific toys were provided for the mothers to use in interacting with their children (Light, IP).

Communication interaction has also been studied through the use of prepared scripts and tasks designed to study a specific aspect of the interaction. These contexts are often developed in an effort to reduce the time needed for ongoing observations in natural environments, or to study the user's ability to perform particular aspects of communication in optimal situations. Bailey and Shane (UP-1983) and Christopulos and Shane (IP) have used "barrier-tasks" in conversational exchanges in which the communication partner attempts to identify a painting or a series of objects described by the aided speaker. Farrier, Yorkston, Beukelman and Mariner (IP); Yorkston, Beukelman and Marriner (IP); and Marriner (IP) have developed a series of direction-giving tasks (with "barrier"), joint decision-making tasks and message transmission tasks to assist them in studying interaction between aid users and others. Tasks were created in an effort to develop "in-clinic" contexts used to examine various aspects of discourse between aid users and others, including conversational control and "summoning power" (McKirdy and Blank, 1982). Elicitation scripts have also been developed to study the ability of an augmentative communicator to produce a variety of communicative acts (Blackstone and Cassatt, IP; Light, IP), and to study attention-getting behavior (Miller and Kraat, UP-1984). Some of these unpublished tasks and scripts are included in the Appendix of this report. Validity studies are still needed to determine the relationship of performance on artifical conversations and constructed tasks to conversational performance in the natural environment.

A variety of partners have been observed in these studies. Children who are augmented speakers have frequently been studied in interactions with familiar adults (e.g., their mothers, caregivers, teachers and other professional staff members). Most of these interactions are dyadic exchanges rather than group interactions. The interaction between children using augmentative systems and peers, siblings and other children has been less frequently studied. To date, child-child interaction has been included in the studies of Christopulos and Shane, (IP); Barker and Henderson, (IP); Wieder and Kornet, (UP-1983); and Harris, (1978, 1982). Interaction between children and adults who are unfamiliar with the child or their system has also been minimally studied (Sponseller and Laikko, UP-1983; Christopulos and Shane (IP); Morningstar, UP-1981).

Young adults and adults have generally been observed in interactions with professionals or persons who are strangers to the augmented speaker. To a lesser extent, adults have been observed in interactions with family members, peers, nurses and home attendents, and other augmented speakers. To date, no studies have been identified that explore the interaction between an adult with an augmentative system and an able-bodied child.

Interaction studies in other fields have demonstrated how the particular style or status of a communication partner can influence the nature of an interaction. In examining communication with augmented persons, some studies have specifically looked at the effect of partners and their behaviors on the interaction. Several researchers have been interested in the interaction patterns between augmented communicators and unfamiliar and familiar persons (Morningstar, UP-1981; Husche and Staudenbaur, UP-1983; Sponseller and Laikko, UP-1983; Waldron, Gordon and Shane, 1980; Fishman and Kerman-Lerner, UP-1983; Christopulos and Shane, IP). Of interest has been how the aid user adapts to an unfamiliar listener, the different modes and forms used with these unfamiliar groups, and the areas of special difficulty encountered by the aided speaker. Many of these studies have also observed the behaviors of unfamiliar persons encountering aid users for the first time.

Other researchers have been interested in differences in interaction that occur in conversation with a variety of familiar partners (Weiner and Kornet, UP-1983; Beukelman and Yorkston, 1980; Bailey and Shane, UP-1983). These studies have looked at interactions of parents, teachers, siblings and attendants with the same aid user, and examined the success of those exchanges, including the patterns that occur. Some researchers have looked across dyads (e.g., mother-child) for patterns of interaction between familiar partners and aid users (Blackstone and Cassatt, IP; Culp, UP-1982; Colquhoun, UP-1982; Shere and Kastenbaum, 1966; Wexler et al, UP-1983).

Interaction patterns have also been studied with the same partners interacting in different tasks and sub-environments (Andrews, UP-1980; Ferrier et al, IP; Weiner and Kornet, UP-1983; Harris, 1978, 1982; Light, IP; Blackstone and Cassatt, IP; Yorkston et al, IP; Barker and Henderson, IP). These may be activities within a classroom such as snack time, versus a group instructional activity, different types of play activities or a variety of structured tasks varying on some dimension (e.g., the amount of information that one partner has, or a comparison between unstructured and structured conversational exchanges). These interactions have been compared to further our understanding of how context effects the nature of aided interactions. Additional studies examine conversations of an aid user in different contexts, but with different partners involved in those contexts (Andrews, UP-1980; Calculator and Dolloghan, 1982; Kraat, UP-1979; Beuttemierer, UP-1983). These studies have included observations in clinical sessions versus everyday environments, and home versus school.

In summary, much of our current information is based on children communicating through direct selection systems with adults who are staff or caregivers. This in itself is a special kind of interaction in that one member is in a more powerful, authority role in relation to the other. Our knowledge of able-bodied children's conversations with teachers and mothers suggests that these conversations may be marked by domination by the adult and question-directed behaviors (Mishler, 1975; Corsaro, 1979). On the other hand, our current understanding of adult communication aid users is based on research in which these adults have primarily been asked to communicate with strangers or professional staff members. Again, these are specific types of conversational exchanges. One need only imagine videotaping oneself in conversation with a stranger not of one's choice to understand the difference in the communication dynamics between this conversation and one with a good friend. Our current understanding of the communication process and performance of aided speakers is also based on widely varied contexts. These include observations in the natural environment (open-ended to specific sub-activities), artificially constructed situations for conversationasl sampling (two persons asked to participate in an open-ended conversation or a topic-structured one), and elicited tasks. It is quite probable that each of these contexts contains different communication demands open to both partners. Consequently, findings must be interpreted within the contexts involved.

## Formal Studies: What Aspects of Interaction Have We Been Studying?

Given all the dimensions of interactive communication and discourse that could be studied, one realizes that few areas and questions have actually been addressed through formal study. However, a few aspects of communicative interaction have been studied with some frequency. To date, the studies on interaction between aid users and others have primarily focused on: (1) analyzing the effects of different augmentative systems, contexts and partners on various features and patterns of interaction; (2) examining specific aspects of conversational discourse and how these are accomplished when one partner is using a technical aid; (3) describing the types of communicative acts expressed during conversational exchanges by both partners, and the form and content used to express those intentions; (4) tabulating the density of the social interaction that occurs between aid users and others, and whether or not opportunities for interaction are maximized; (5) analyzing the interaction patterns of all partners in a communication exchange to gain a better understanding of what behaviors facilitate and/or impede the interaction process; (6) examining the attitudes of communication partners or potential communication partners toward particular augmentative modes, or augmented speakers; and (7) noting the effects of specific training programs and procedures on the interactions that occur. Of these areas of study, communicative acts and discourse structure have been given the most attention to date in both single case and comparative studies.

**The Differential Effect of Communication Aids, Contexts and Partners** Several of our interaction studies have been comparative. Researchers have been interested in whether or not interactions differ when one device or mode versus another is used by the augmented speaker, and if so, how. There has also been increased interest in how the partners in the interaction, and the communication contexts themselves, differentially affect the nature of an interaction, with a specific aid user or group of users.

Currently, there are multiple communication aids available to severely speech-impaired persons. These augmentative devices differ widely in the language that is available to the user, the speed of communication, the degree of participation needed by the partner to create an utterance and the modes through which a communication is transmitted. Various researchers have begun to examine how these "system" differences may influence the interactional process. This has been examined in studies that compare conversations with and without formal augmentative systems when an electronic device is used in comparison to a manual or non-electronic system; when alphabet boards are expanded to include words and phrases; and when different communication device modes (e.g., print or voice) are used.

Three studies have examined interactions when electronic versus non-electronic devices are used. Beukelman and Yorkston (1980) looked at the different comunicative acts produced by a young adult with brain stem injury who used both an alphabet board (direct selection) and a stationary typewriter to communicate in a nursing home environment. Their study specifically examined the interactions that took place over two 8-hour periods. During the first 8-hour period, the adult used only the alphabet board for communication, and in a second 8-hour period, communication was restricted to the use of a typewriter. Fishman and Kerman-Lerner (UP-1983) tabulated the use of non-electronic versus electronic aids in the daily interactions of three severely-impaired adults using multiple systems and living in an institutional environment. Unfortunately, both the Beukelman and Yorkston, and the Fishman and Kerman-Lerner studies observed the behaviors of the augmented speaker alone, and did not include the interactive behaviors of both partners in the exchanges. However, Buzolich (UP-1982, 1983), in her doctoral dissertation, compared the use of a non-electronic and electronic communication device within an interactional framework. She compared the interactions that occurred between an unfamiliar adult and a user of a HandiVoice 120, who also used an alphabet board. Two dyads were compared. In each situation, the aided communicator used the alphabet board for 20 minutes of interaction, and the voice output aid for an additional 20 minutes of open-ended conversation. These interactions were compared with respect to turn-taking, contingent queries and repair, interruptions and overlap, and topic maintenence.

Other researchers have chosen to examine the effects of modified language boards, as well as the changes in interaction that occur when a language board is used and is not used. Wexler et al (UP-1983) examined the differences that occurred in conversation samples under two conditions between a familiar staff member and an augmented adolescent or adult. The partners in each dyad were asked to converse for ten minutes without the use of the alphabet board, and for ten minutes with the alphabet board available. The conversations were analyzed extensively in relation to the communicative acts that occurred in both conditions. Blau (IP) is in the process of further analyzing these dyads in the board/no-board conditions to examine backchannel signals, hyperexplanation and conversational repair. Bailey and Shane (UP-1983) also compared the interactions that occurred with and without the use of a non-electronic communication system, but this was with different partners. They studied and compared the interactions of a 13 year old boy who primarily used speech and gesture with his mother and an Etran-type system with his school aide. Calculator and Luchko (1983) compared the effect on communication of alterations to a language board when used by a 24 year old woman in an institutional environment. Initially interaction was observed with the woman using an unmounted, alphabet only system. This system was then stabilized and words and phrases were added. Interactions using the two non-electronic systems were compared in relation to communication functions, the forms used and the speaker roles.

During the 1970s, Alphonse Chapanis and his colleagues at Johns Hopkins University conducted a series of studies on interactive communication through non-speech channels (Michaelis, Chapanis, Weeks and Kelly, 1977; Weeks, Kelly and Chapanis, 1974; Ochsman and Chapanis, 1974; Kelly and Chapanis, 1977). Of particular interest to this group of researchers was how human communication was affected by various technical modes of interaction (e.g., typed communication, handwriting, voice without observing the person's face, etc.). Although they were interested in non-speech communication in relation to computer and mass-media communications, their experiments and findings contain many important insights and implications for interaction between augmented speakers and others. In these studies, an able-bodied person was assigned to a particular communication mode, with or without restricted vocabulary, and asked to solve task-oriented problems with another person who used natural speech.

Other researchers have also used able-bodied persons to study the effect of our aided communication systems on communicative interactions. Farrier et al (IP) are currently studying the interactional differences in a series of direction-giving and decision-making tasks in a condition in which both partners use speech and non-verbal behaviors, and in another condition in which one partner is asked to use an Expanded Memowriter (alphabet printer device). In a variety of two and three person conversations, able-bodied persons using communication devices have also been studied through class projects at the University of Wisconsin under the direction of David Yoder.

It is obvious that we have a very small research base for understanding the impact of system features on the interaction process. However, some methodologies for exploring this have been devised and initial work is being done. Admittedly, this area of research is an important but difficult one to study. Separating the impact of aid characteristics from the communication abilities of the user and the communication context is a challenging problem. Clearly, these are highly integrated behaviors.

## Aspects of Discourse and How These Are Accomplished

Conversation between two or more able-bodied, talking persons has a particular organization and structure which allows these persons to interact in a conventional, orderly manner. Several linguistic and non-linguistic devices are used by both speakers to accomplish this exchange. Since aided communication is markedly slower than speech and many conventional discourse devices are not available to the speech-impaired partner, it is of interest to study how conversation proceeds when one partner is participating with limited or different forms of communication available.

One can view conversational structure in three major segments: (1) the initiation of a conversational exchange; (2) the extension and maintenance of that conversation; and (3) the termination of the interaction. In reviewing the published, unpublished and in-progress studies, it is apparent that study of all three aspects of conversational organization has begun, with the majority of the efforts addressing the extension or maintainence of the conversational sequence.

Only those studies of observations in the natural environment lend themselves to an understanding of who initiates a conversation with whom, and how. Some preliminary information in this regard may be found in the studies of classroom interaction (Harris, 1978, 1982; Andrews, 1980; Calculator and Dolloghan, 1982; Barker and Henderson, IP), as well as observations in the home or institutional environment (Lossing, UP-1981; Kraat, UP-1979; Calculator and Luchko, 1983; Shere and Kastenbaum, 1966). Attention-getting is a necessary prerequisite to initiating a conversational sequence, as well as for turn-taking and maintaining one's turn. An initial study by Miller and Kraat (IP-1984) has explored this ability with a four year old child. Other researchers have made observations about the non-speaker's ability to gain attention in order to communicate within the contexts of larger observational studies (Harris, 1978, 1982; Calculator and Dolloghan, 1982; Beuttemeirer, UP-1983; Huschle and Staudenbaur, UP-1983; Shere and Kastenbaum, 1966; Light, 1985).

Once a conversation has begun, multiple linguistic and non-linguistic behaviors and devices are involved in the extension and maintenance of that conversational sequence. In an effort to learn how these are accomplished and to understand the problems and differences that might be encountered, studies of several of these behaviors and devices in the interactions of communication aid users have begun. Turn-taking structure, obligatory and non-obligatory discourse, topic initiation, communication breakdown and repair, and speaker-listener roles have received the most attention to date.

Turn-taking behaviors have been studied by researchers in different ways. These studies have explored the number of turns taken by each partner, the length or number of utterances in these turns, and the number of turns taken in a particular conversational sequence (the total sequence or the number related to a specific topic). This turn-taking behavior has been examined across a variety of aid users, partners and communication contexts. How two people exchange turns in an orderly fashion when one partner is using a technical aid has been described in the work of Higginbotham (UP-1982) and Buzolich (UP-1982, 1983). The behaviors of both partners in these exchanges have been compared to turn-taking procedures between able-bodied speakers. Turn-taking behavior has also been explored in relation to how an aided speaker's utterance is realized or not realized within discourse and turn-taking. It is often the case that the aided communicator has a restricted vocabulary or actively needs the "listener" to participate in the formulation of the utterance over several turns. These types of exchanges have been observed within the research projects of several investigators (Wexler et al, UP-1982; Harris, 1978; Farrier et al, IP; Buzolich, UP-1982, 1983; Colquhoun, UP-1982; Morningstar, UP-1981; Blau, IP; Waldron, Gordon and Shane, UP-1980; Fishman and Timler, UP-1983; Huschle and Staudenbaur, UP-1983; Light, IP; and Lossing, UP-1981).

Of particular interest has been the participation of augmented speakers in the initiation and response status of these turns. In other words, who is taking the lead and who is following. However, it is important to note just what initiation behaviors a particular research study is referring to before drawing conclusions. Some researchers discuss initiation in relation to the initiation of a conversational sequence; others use it to refer to the initiation of a novel topic only; and still others use the term to refer to the production of unrequired utterances in a conversation (those utterances that are not mandated by the previous linguistic utterance where the partner has the option of saying something or not saying something). The latter type of initiation behavior has been further studied across utterances in a dialogue to extract patterns of participation and control (Light, IP; Kraat, UP-1979; Harris, 1978, 1982; and Farrier, Yorkston, Beukelman and Marriner, IP). This turn-taking behavior has also been studied using varied terms: required and non-required utterances, obligatory and non-obligatory utterances, contingent and non-contingent turns, and obligations and comments. The most extensive analysis to date on the contribution and nature of these discourse roles is being carried out through the in-progress studies of Light, and Farrier et al.

Topic initiation and extension has primarily been studied by Buzolich (UP-1982, 1983) within a framework of topic-relevant acts and topic responses in two dyads. This study reveals which partner added to the topic and how this behavior altered when the aided speaker used an alphabet board versus a HandiVoice 110 with the same communication partner. Other researchers have examined topics in a more limited manner, noting when new topics were introduced and by whom. Lossing (UP-1981) attempted to look at the topics discussed in interactions with physically disabled adults and others, with a special interest in those that addressed self care and personal management. These topic categories were later used by Fishman and Kerman-Lerner (UP-1983) in their observations of the communication initiations of three other adults using augmentative systems.

Communication difficulties are observed and reported with high frequency in interactions between aid users and others. These communication breakdowns and miscommunications, as well as the subsequent attempts to resolve or repair the communication situation, have received considerable attention in formal studies of interaction (Beukelman and Yorkston, 1980; Calculator and Delaney, UP-1984; Buzolich, UP-1982, 1983; Fishman and Timler, UP-1983; Huschle and Staudenbaur, UP-1983; Mathy-Laikko and Ratcliff, UP-1983; Bailey and Shane, UP-1983; Miller and Kraat, UP-1984; Blau, IP; Ratcliff, IP). Other researchers (e.g., Light, IP; Wexler et al, UP-1983) have included information about communication difficulties in their reports of the success of various partners and exchanges. Here again, one must be cautious about comparing and contrasting results since several of these researchers define communication breakdown and repair quite differently. For example, one researcher may tabulate an incomplete utterance and a request for expansion as a communication breakdown, whereas others might not consider this a breakdown unless the full utterance, once completed, was not understood. With regard to discourse, conversational breakdowns have been studied in reference to successful initiation of a topic of conversation, successful regulation of discourse, and the gaining of attention in order to communicate. These breakdowns have been further studied in terms of the success that one or both partners have in attempting to actively resolve these miscommunications.

Two additional areas of discourse maintenance have been studied to date. Both Buzolich (UP-1982, 1983) and Blau (IP) have been interested in studying the various types of backchannel behaviors that do and do not occur in specific interactions. The backchannel behaviors outlined by Duncan and Fiske (1977) have served as a starting point for the different coding schemas and analysis developed by these two researchers for application to augmented speakers. Blau's backchannel taxonomy attempts to capture the types of acknowledgements and feedback that are traded back and forth between two speakers during a conversation, and the continuous technical feedback and repair that occurs in the use of an alphabet board (e.g., repeating the letters indicated, completing a partially spelled word or requesting confirmation of a letter or sentence meaning through the use of rising inflection). Buzolich's taxonomy and research interest in backchannel behaviors were directed toward how these backchannel signals (e.g., sentence completions, requests for clarification head nods for repair and feedback, restatements) are different from those used by able-bodied speakers and, consequently, different in how they fit into the turn-taking system. Barker and Henderson (IP) and Buzolich (UP-1982, 1983) have chosen to study interruptions, over-lap and simultaneous "talking", another aspect of conversational structure that has received little attention to date. Of particular interest in the study by Buzolich (1983) were the differences in these behaviors when the aided communicator was using an alphabet board versus a synthetic speech device.

Last, the termination of a conversational sequence has been examined in two studies (Kraat, UP-1979; Barker and Henderson, IP). Of interest here is who terminates the exchange, and how.

Communicative Acts and Their Form and Content With the shift in emphasis from syntax and vocabulary to the use of language in social interaction, the utterances of both the aided communicator and speaking partner have been examined somewhat differently. Form and content are seen as an integral part of language use. That is, the specific form and content used at any given point in a conversation is related to the context and the intentions or functions the speaker wishes to use language for.

Several research studies on aided interaction have addressed communicative acts and intentions. They have investigated the type, variety and frequency of various speech acts, or communicative acts, produced in these interactions by both partners. The study of communicative acts has been the primary focus of the research of Wexler et al, UP-1983; Blackstone and Cassatt, IP; Light, IP; Sutton-Colquhoun, UP-1983; Colquhoun, UP-1982; Culp, UP-1982; Andrews, UP-1980; MacDonald, UP-1983; Wieder and Kornet, UP-1983. These studies do not utilize a uniform set of communicative acts or taxonomies to describe these intentions, but with and without some variations, they draw from taxonomies developed to study other populations.

The types of research questions that have been asked in relation to communicative acts examine modes and forms the augmented speaker uses to accomplish these acts, the communicative acts that occur with variations in partners, device and contexts, and the frequency and variety produced by both participants. Researchers have also been interested in whether or not the non-speaker possesses the competence to engage in communicative acts (e.g., their ability to produce these acts under ideal conditions), and how this competency relates to their occurence and actual use in natural conversations (Light, IP; Blackstone and Cassatt, IP; Sutton-Colquhoun, 1983).

Since augmented speakers use a variety of communication modes to participate in interactions, several studies have examined which modes are being used by aided communicators, and for what functions. These studies have been looking at the percentage and type of communications effected through the use of language boards and devices, dysarthric speech, non-verbal behaviors, gestures or signs, and combinations of these behaviors. Of particular interest are the studies of Weider and Kornet (UP-1983), MacDonald (UP-1983), Blackstone and Cassatt (IP), Andrews (UP-1980), Wexler et al (UP-1983), and Beukelman and Yorkston (1980). The form of utterances has also been examined by several researchers in relation to grammatical completeness, mean length of utterance and the ways in which the "listener" participates in the realization of the aided speaker's intentions.

The Density of Social Interactions Observations of aided communicators in the natural environment have afforded an opportunity to look at the density of social and communicative interactions that occur with a given aid user. These studies have provided information about the number of interactions that take place, the number of different partners that interact with the aided speaker, and the variety of environments in which these interactions occur. Information has also been tabulated with regard to the length of these interactions, the level and purposes of these exchanges, and whether or not additional interactions could have occurred but did not (Harris, Lippert, Yoder and Vanderheiden, 1979; Shere and Kastenbaum, 1966; Kraat, UP-1979; Harris, 1978, 1982; Calculator and Luchko, 1983; Beukelman and Yorkston, 1980; Colquhoun, McNaughton and Izzard, 1982).

The density of social and communicative interaction has also been examined within conversations or in structured situations (e.g., two people are asked to talk with each other). The questions addressed in these studies include whether or not the aided communicator is provided with an opportunity to participate, the extent of that participation, and the communicative levels and topics involved in those interactions. Recent studies have also begun to examine the possible contributions of the aided communicator to reduced levels of interaction (Farrier, Yorkston, Beukelman and Marriner, IP; Light, IP; Kraat, UP-1979; Yorkston, Beukelman and Marriner, IP). That is, are these speakers utilizing opportunities for greater participation?

The Interactive Strategies and Aid Characteristics That Facilitate and Impede Interaction Professionals who work with aid users and the users themselves have made multiple observations and suggestions about what strategies are most effective in facilitating interactions between augmented speakers and others. In addition, many opinions have been expressed as to how particular aid characteristics or the use of specific components in an augmentative communication system can positively and negatively affect an interaction, and how difficulties imposed by these characteristics might be best circumvented or reduced. However, to date, few formal studies have focused on this aspect of aided interaction.

In what is probably the most extensive examination of facilitory vs. non-facilitatory interaction patterns in this population to date, Shere and Kastenbaum (1966) have investigated the qualitative aspects of interactions between mothers and their non-speaking, physically handicapped young children aged two to four years. The children in this 1966 study did not have access to aided communication systems, and their interactions were limited to non-verbal expressions, vocalizations and some gross pointing or reaching movements. This study examined the interactive styles of 13 mothers and their children in relation to the purposes of those interactions, the style of the interaction (verbal, non-verbal, action), the communicative acts used, and initiation and response patterns. These behaviors, in turn, were analyzed with respect to whether these patterns fostered or inhibited social, cognitive and communication development. The effect of communicative styles on interaction is also being studied by Marriner (IP), who is examining the types of questions used by the able-bodied speaking partner, and the resulting effect on the communication participation of aided communicators.

Research studies that address other areas of interaction (e.g., communication breakdown and repair; communicative acts; discourse organization) have made observations about communication styles and behaviors on the part of the aided communicators and the able-bodied speakers. Several of these researchers have suggested behaviors and aid characteristics which appear to have a positive and negative impact on the quality of the interactions observed (Morningstar, UP-1981; Bailey and Shane, UP-1983; Colquhoun, UP-1982; Culp, UP-1982; Blackstone and Cassett, IP; Huschle and Staudenbaur, UP-1983).

Attitudes Toward Aided Communication and Communicators The creation and impact of attitude has received greater attention in discussions of interaction than from empirical research per se. Data-based research regarding attitudes of able-bodied persons toward aid users and this type of communication medium, as well as the user's attitudes toward aided communication and their able-bodied partners, is in its infancy. Some limited information has been collected in questionnaires and surveys that ask parents and caregivers their attitudes about specific devices or communication (Tew, Davies and Fletcher, 1980; Harris; Colquhoun, McNaughton and Izzard, 1982; Levy and Strobino, UP-1982). Coxon and Laikko (UP-1983) and graduate students at the University of Wisconsin in classes with David Yoder have looked at the reactions of people unfamiliar with communication aids and aided speakers, to this form of communication. Coxon and Laikko played videotapes of interactions in which one partner used the Express 3 (in direct selection mode) in three different modes: visually selecting the items as if using a non-electronic aid, using printed output and synthesized voice. Observers who were sensitized to physically handicapped persons, and a group who had no experience with this population, rated these modes of communication and completed a questionnaire about the interactions. The students at the University of Wisconsin selected four communication modes: signing, the Canon Communicator, the Auto-Com and a Blissymbolics board. They interacted using these systems in four different environments--a store, a restaurant, a school and a YMCA--with persons who were unfamiliar with this type of communication. Those persons who interacted with these "users" were then interviewed and asked to rank their preferences for these various modes of communication.

Buzolich (1983) has taken a very different and interesting direction in her study of the perceptions of aid users. In her dissertation research, two dyads were examined using both a micro- and a macro-analysis. The micro-analysis looked at specific behaviors in the interaction (e.g., turn-taking, backchannel signals). The macro-analysis attempted to capture whether or not the observed differences really made a difference in the listener's perceptions of an augmented speaker and, if so, which ones. Buzolich was interested in the social validity of our analytical observations. She compared the communication aid users' self perceptions of communicative competence when using two systems, to the perceptions of the communicative partners. This was further examined by asking 25 naive observers to view parts of the different interaction samples, and to judge which of the two samples represented a more effective communicative interaction.

Effect of Specific Training Procedures on Interactions The paucity of research studies on the effects of particular training procedures and goals on the interactional process reflects our lack of understanding of the importance of training, and what should be trained. As indicated earlier, many professionals felt that, given training in the operation of aid components, interfacing and symbol identification, communication interaction with others outside of the treatment setting would successfully take place. Observations of poor use were often attributed to sources other than the training that had or had not been provided (e.g., the partners reluctance to use communication aids, the limitations of the aids themselves, passivity on the part of the users). However, we have now come to realize that specialized training is needed, and collectively we are beginning to grapple with what training should be done, and how to make that training effective.

While the IPCAS Project has brought together many views and opinions about training and what we need to study, only four formal, data-based studies of training have been identified to date. Calculator and Luchko (1983) studied the effects of a specific interaction training program over a three week period on the interactions of a young woman in an institutional environment. These findings were then compared with the interactions that occurred following in-service training for the staff regarding how interactions could be improved. Reichle and Word (1985) have demonstrated the utility of a specific sign-device training program for an adolescent boy. Using a pre- and post-training design, Barker and Henderson (IP) are currently in the process of studying the effects of training specific interaction skills through the use of the Apple computer, and its impact on the interactions of these children in three contexts within the school program. Additionally, Glennen and Calculator (UP-1983) have studied how non-speakers are trained in vocabulary items and the effect of this training on vocabulary use in natural environments and situations. These researchers trained two children using Etran-type systems to initiate requests for actions and objects through pragmatic procedures in which the initiations emanated from the context rather than the clinician's questions. They then noted these children's spontaneous requesting behavior outside of the treatment setting.

In summary, it appears that we have formally studied only a few areas of communication interaction and exchange. Other aspects of communication and conversation have remained relatively unexplored. To date, we have primarily focused on how turn-taking, initiation-response sequences, and communication breakdown and repair are managed in this type of discourse. In addition to these regulatory aspects of conversation, our studies have frequently explored the communicative acts that are expressed by both partners in these exchanges, and the communication modes that are used by the augmented communicators to express communication intentions. In much of our current research, we have used these communication measures of discourse regulation, communication acts and modes to compare interactions across contexts and aid users. Given the five published studies on interaction in this population, and the additional 36 empirically-based studies obtained through the IPCAS study, we have an initial, but still limited knowledge base about interaction between augmented communicators and those they communicate with. We need much more information about a variety of dyads and users, and how they accomplish effective communication and interaction in various situations. Additional areas of communication and interaction need to be explored, and those already under investigation need to be multiplied and broadened. Fortunately, this core of information continues to be broadened and embellished by the observations and perspectives of persons using communication aids and those actively involved in implementing these systems.

## Formal Studies: Contemporary Approaches to the Data

It is important to look at how we have been getting from an interaction event to some tentative conclusions about the interaction process that occurs between two or more people, when one or more of these participants is communicating through a technical device or other augmentative form. Each of these communication events has been observed in some manner, and the communication behaviors of each partner have been transcribed and/or judged to belong to some category of interaction which is of interest to the researcher. These data, in turn, are analyzed according to the questions asked by the researchers, and appropriate conclusions are drawn. In examining the formal studies of interaction in augmentative communication, it is apparent that researchers have taken widely varied approaches to these data. It is also apparent that very different assumptions and models have been used in the interpretation of the observations made.

In our evolutionary growth, it is interesting to note our changing attitudes toward device use and where it fits into the study of interaction. In the newness and excitement of applying technical aids, our initial studies were "aid driven". That is, we often ignored the augmented speaker as a communicator, and concentrated on what was or was not happening with the aid. We wanted to know how much it was being used, when, and what it was doing for the people using it. This preoccupation with communication only through the technical aid has abated somewhat as we acknowledge the need for these individuals to use multi-modal channels of communication. This realization has increased our interest in including non-verbal behaviors and vocalization/ speech in our measurements and analysis. We have become more holistic and ask not only how well the person is doing with a particular aid, but how well the person is doing as a communicator.

Contemporary researchers have generally been asking quantitative questions. For example, does "x" behavior occur in the interaction and, if so, with what frequency of occurrence? The quantification of interactions has given us such information as the number of times a device is used as opposed to a gesture or dysarthric speech; the frequency of topic initiations by both partners; the number and variety of communicative acts such as question-asking, commenting, affirming and social greetings; the number of communication breakdowns in an interaction; the frequency of use of various repair strategies by each partner; and the frequency of required versus non-required utterances. When completed, these studies generally interpret this quantitative information in terms of how augmented communicators and partners are performing in comparison to able-bodied, talking partners. This is usually presented in terms of augmentative communicators and partners doing more or less of "x" behavior.

More recently, researchers and professionals have become interested in the qualitative aspects of these interactions. This is a significant and innovative aspect of our quest to understand the nature of effective communication via technical aids and other augmentative systems. The question here becomes not what the participants do in relation to able-bodied speakers, but how they accomplish a particular aspect of interaction or co-construct that interaction. An example of this type of research can be seen in the preliminary work of Higgenbotham (UP-1982) and Buzolich (UP-1983, 1984) on how communication dyads accomplish turn-taking when one member is using an alphabet or word/alphabet board or synthesized speech-output. Alison MacDonald's work (UP-1983) presents us with another example. In her study of a 12 year old boy, she attempted to describe how this augmented speaker integrated various augmentative modes to be an effective communicator with his partner. Other studies that contain a qualitative approach to understanding and interaction behaviors can be found in Andrews (UP-1980), Weider and Kornet (UP-1983), Mathy-Laikko and Ratcliff (UP-1983), Sutton-Colquhoun (UP-1983) and Buzolich (UP-1983). These studies represent the first steps toward an understanding of the process and uniqueness of communicating through communication devices and systems.

Researchers have also begun to look at interaction data in relation to the effectiveness or success of the behaviors in an interaction. To date, much of this information is implied or assumed from the quantitative data. For example, researchers have examinined the causes of a communication breakdown and the effects of different resolution strategies, or whether or not a bid for a turn using a specific mode and timing was, in fact, responded to. A few studies have defined what the researchers mean by "success" and "effectiveness" and have examined it directly (Calculator and Dolloghan, 1982; Culp, UP-1982; Miller and Kraat, UP-1984; Waldron, Gordon and Shane, UP-1980). We have yet to adequately define the effectiveness and success of these turns as they relate to augmentative communication, or to delineate some of the behaviors associated with these turns. It is important that we do so.

In reviewing the studies on interaction with augmented speakers, one notes that several measurement procedures and methodologies are currently being used. Studies have employed different transcription means, coding schemas and definitions. These procedures have been applied to interactions that are highly varied in terms of partners and contexts. This makes the comparison of these results exceedingly difficult, and contributes to our current lack of information about this special interaction process. However, at this stage of our development we are unsure of the methodology that should be used or that would be most fruitful to our future understanding. Hence, such exploration is necessary. Several of our currently applied measurement techniques will be briefly outlined here.

Collection and Transcription Interaction behaviors are frequently collected through videotaping the interactions that occur in a structured situation or in the natural environment. Videotaping may or may not be accompanied by additional audiotapes of the spoken portion of the exchange and additional observer comments about the ongoing interaction and context. Researchers have reported varying difficulties with the use of videotaping to collect interaction data. Although tapes and supplemental notations probably provide the richest information base for studying interaction, videotapes often do not provide sufficient views of all participants or the linguistic materials that are pointed to or printed out via communication systems. Videotaping is also difficult and may interfere in a physically active interaction sequence, or when an aid user is moving through a series of contexts and environments in a natural setting.

Several researchers have attempted to circumvent these problems by attempting to capture interaction data through "on-line" coding, or transcriptions. In this form of collection, one or more researchers observe the interaction and either record verbatim what they observe, or use some form of pre-determined coding sheet, and note the occurrences and modes used for the specific interaction areas under observation. On-line coding is often possible in observing interactions between aid users and others because of the slow rate of transmission of an utterance by the aid user and/or the reduced number of interactions that seem to occur. For example, in the study of Beuttemeirer (UP-1983), it took considerable time to collect ten interactions per subject. On-line transcription and coding has been used by Beuttemeirer (UP-1983); Beukelman and Yorkston (1980); Lossing (UP-1981); Andrews (UP-1980); Kraat (UP-1979); Shere and Kastenbaum (1966); Miller and Kraat (UP-1984); Calculator and Dolloghan (1982); and Calculator and Luchko (1983) with varying success. If reliable, this type of information collection affords us the opportunity to make ongoing observations of interactions in the natural environment in a manner that may be less intrusive than videotaping, yet still highly informative.

One is often concerned that "on-line" observations are incomplete and unreliable. The behaviors that occur are fleeting and the information is only as good as the coder's eye. However, reported reliability information on some of these observations can be rather high (e.g., Beuttemeirer, UP-1983). It appears that the success of this methodology may be dependent on the number and types of behaviors that are being observed, the rate at which they are occurring, the training in the coding procedure prior to the study, and whether or not reliability has been achieved by the coders in practice sessions prior to the actual observation situation. Fishman and Timler (UP-1983) recently performed an interesting comparison of interaction information obtained through videotaping, and on-line coding plus audio recording. For the particular interaction studied, the authors suggested that on-line coding in conjunction with audio recording could be as informative and reliable as videotaped information. Obviously, audiotapes in and of themselves are extremely limited in terms of capturing non-verbal and contextual information in an interaction. Researchers who have used this collection method have generally found it unsatisfactory.

Some researchers who videotape interactions go through a process of transcribing these tapes, or portions of interest, prior to coding and analysis. Others code directly from the videotapes themselves. The same is true for those using on-line coding. Some observers attempt to transcribe the interaction; others go directly to coding formats for what they are seeing. Whether or not one transcribes or directly codes seems to be dependent on the level of analysis required, and the research questions being asked. For example, if one wanted to study the number of interaction sequences that were initiated by a given aid user over the course of a 24 hour day, this could be tabulated quite easily by an observer coding "on-line". However, if one were to study how specific communication breakdowns were resolved, or how turns are exchanged between two people, it may be more informative and appropriate to use videotaping and transcription. Transcription also allows the researchers to approach the data without preconceived notions and categories of behaviors.

Several research studies to date have used transcriptions as a basis for data analysis (Wexler et al, UP-1983; Light, IP; Buzolich, UP-1982, 1983; Higgenbotham, UP-1982; Farrier et al, IP; Kraat, UP-1979; Fishman and Timler, UP-1983; Culp, UP-1982; Huschle and Staudenbaur, UP-1983; Wieder and Kornet, UP-1983). The particular format and notations used for that transcription vary with the researcher. Some have used transcription methods developed for language samples on verbal children such as Bloom and Lahey (1978), Ochs (1979), Miller and Chapman (1983) and Schenkein (1979), either as they are presented or with some modifications. Others have chosen to develop their own transcription format to fit augmentative communication modes and the specific behaviors they are studying (Higgenbotham, UP-1982). Some of these unpublished transcription formats or modified versions of published notation systems can be found in Appendix D of this report.

In reviewing these transcription formats some differences are apparent, particularly with regard to the non-verbal behaviors that are included, the segmentation of an utterance or turn, whether or not proxemics are included, the pause times noted, the paralinguistic features identified, and the handling of over-laps or simultaneous behaviors. Researchers using transcriptions have generally not addressed reliability issues in transcription. To date, reliability measures have been reported only in the ongoing study by Light (IP). It needs to be recognized that transcription information is filtered through the observer of that behavior, and is not necessarily a duplication of the events that actually occurred.

Coding of Behaviors Data is categorized or coded along specific parameters of interest to the researchers. These coding systems, or taxonomies, place observed behaviors in specific categories of communication and interaction behavior. These categories, among others, may be modes of communication (e.g., device use or head nods); the perceived intentions of a person's utterances (e.g., to anger, to seek information or to joke); discourse relationships (e.g., initiation of a sequence or topic, or whether or not options to take a turn were available and taken or not taken); or, social density categories (e.g., the frequency or duration of an interaction, or notation of the different partners that were interacted with). Researchers studying a particular aspect of communication interaction again have a choice. They can use pre-established taxonomies for the interaction or communication area they are interested in studying, or they can develop a coding categorization of their own based on the observed behaviors and the particular research questions being addressed.

Several researchers have chosen to use pre-established coding systems, or modifications of these taxonomies (Andrews, UP-1980; Colquhoun, UP-1982; Culp, UP-1982; Harris, 1978, 1982; Wexler, Blau, Leslie and Dore, UP-1983; Blackstone and Cassatt, IP; Ferrier, Yorkston, Beukelman and Marriner, IP). In general, these taxonomies were developed by other researchers for the study of communication behaviors in able-bodied children and adults. These coding systems are frequently modified when applied to augmented communicators and their interactions in order to be able to accommodate some of the unique behaviors and situations that occur in this mode. Some of these unpublished coding adaptations are included in Appendix D. In reviewing studies to date, it is apparent that several different taxonomies and their modifications have been applied. These include the communication acts outlined by Dore (1978, 1977a., 1977b), Dore, Gearhart and Newman (1978), and Halliday (1975); the classification of contingent utterances and discourse codes created by Blank, Gessner and Esposito (1979), Blank and Franklin (1980), Mittler (1976), Mishler, (1975a, 1975b); the communication breakdown and repair categories of Garvey (1979); and topic initiation and maintenance codes of Corsaro (1979). Additional taxonomies have been developed from the work of Duncan and Fiske (1977) in turn-taking and backchannel behaviors; Sacks, Schegloff and Jefferson (1974) in turn-taking; and the paralinguistic and non-verbal behaviors collectively outlined by Higgenbotham and Yoder (1982).

Some researchers have chosen to develop taxonomies and coding systems of their own to study a particular aspect of interaction in the non-speaking population. Examples can be seen in the work of Buzolich (UP-1982, 1983) and Higgenbotham (UP-1982) in studying forms of turn-taking; Miller and Kraat (UP-1984) in analyzing attention-getting behaviors; Shere and Kastenbaum (1966) in examining the qualitative aspects of mother-child interactions; Light (IP) in examining the types and opportunities for discourse continuence; Beuttemeirer (UP-1983) in observing paralinguistic and non-verbal aspects of interaction; Bailey and Shane (UP-1983) in looking at communication strategies; and the separation of technical and communication acts by Marriner, Yorkston and Farrier (1984). Several of the unpublished coding schemas in use in interaction research with augmented speakers (both original and modifications of pre-established coding schemas) have been shared with the IPCAS Project and are also included in Appendix D of this report. Additional taxonomies can be found in the published works of Harris, 1978; Calculator and Dolloghan, 1982; and Beukelman and Yorkston, 1980; Preisler, 1983).

## Table 1

STUDIES ON INTERACTION BETWEEN AUGMENTED SPEAKERS AND OTHERS - Partners and Contexts*

| STUDY | AUGMENTED COMMUNICATORS | PARTNERS | CONTEXTS STUDIED (Environment or Situation) | COMMUNICATION SYSTEM REPORTED |
|---|---|---|---|---|
| ANDREWS (UP-1980) | 6 children with developmental disability<br>Ages: 3-7 yrs.<br>Columbia Maturity Scale: 65-125<br>English Picture Vocabulary Test: 60-100 | Teachers<br>Speech Therapist | Observation - Natural Environment<br>Classroom - Academic lesson<br>- Lunch<br>- Craft activity<br>Speech therapy session | 3 children - Eye pointing to indicate Blissymbols<br>3 children - Direct selection of Blissymbols on board<br># of symbols - 20, 80, 88, 120, 120, 160 |
| BAILEY & SHANE (UP-1983) | 1 adolescent with developmental disability<br>Age: 13 yrs.<br>Receptive language score - 7 yrs. | Mother<br>School Aide | Unstructured conversation (Home & school)<br>Structured task<br>-Picture description (barrier) | Non-verbal - eye gaze, gross gestures, hand movement<br>Vocalization<br>Etran (alphabet) and 2 # coding of words and phrases |
| BARKER & HENDERSON (IP) | 9 children with developmental disability<br>Minimum 6 yr. language reception level | Teachers<br>Students (able-bodied) | Observation - Natural Environment<br>Classroom - Entering classroom<br>- Group instruction<br>- Constructing story board with another student | |
| BEUKELMAN & YORKSTON (1980) (subject 2) | 1 adult with amyotrophic lateral sclerosis (acquired)<br>Age: 58 yrs. | Speech Pathologist<br>Attendants (2)<br>Husband | Observation - Natural Environment (2, 8 hour samples in home) | Zygo 100 (100 cell scanner with alphabet and words available)<br>Speech (20% intelligible) |

* This figure contains only those studies in which the partner's communication behaviors were also addressed.

UP - Unpublished studies (see Appendix A)
IP - In progress studies (see Appendix B)

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STUDIES ON INTERACTION BETWEEN AUGMENTED SPEAKERS AND OTHERS - Partners and Contexts*

| STUDY | AUGMENTED COMMUNICATORS | PARTNERS | CONTEXTS STUDIED (Environment or Situation) | COMMUNICATION SYSTEM REPORTED |
|---|---|---|---|---|
| BLACKSTONE & CASSATT (IP) | 15 children with cerebral palsy<br>Ages: 3-20 yrs.<br>IQ - Average to moderate mental retardation<br>Receptive language levels - 2-14 yrs. | Mothers | Unstructured conversation<br>Elicited contexts<br>-unfamiliar, non-routinized (picnic script)<br>-unfamiliar, routinized (snack script) | Multiple systems, and varied: 7 Etran, 6 language boards, 1 Zygo 100, 2 Express 3, 1 Morse code,2 signs, 6 some speech |
| BLAU (IP) | 8 adolescents and adults with developmental disability<br>Ages: 15-28 yrs.<br>Judged - Normal intelligence | Professionals familiar with augmented communicators | Structured conversation (topics preplanned)<br>-with language board<br>-without language board | All used direct selection of alphabet/words on language boards (4 headstick, 4 upper extremities) |
| BUETTEMEIER (UP-1982) | 5 adults with developmental disability<br>Ages: 19-26 yrs.<br>(Previously studied by Harris et al, 1979)<br>Living in institution | Open - other residents or classmates | Observation - Natural Environment<br>-living unit of institution<br>-school (2 subjects) | 4 of the 5 augmented speakers had augmentation systems (2 Blissymbols & words; 2 words, phrases & drawings 1 primarily used speech) |
| BUZOLICH (UP-1982) | 1 adult with developmental disability<br>Age: 44 yrs.<br>CADL score - 136 | 1 adult (able-bodied) to augmented speaker | Unstructured conversation | Handivoice 120 (voice output) (10 min.)<br>Alphabet board (10 min.)<br>Dysarthric speech |
| BUZOLICH (UP-1983) | 2 adult with developmental disability | 2 adults (able-bodied) unknown to augmented speaker | Unstructured conversation | Handivoice 120 (voice output) (10 min.)<br>Alphabet board (10 min.)<br>Dysarthric speech |

## Table 1

STUDIES ON INTERACTION BETWEEN AUGMENTED SPEAKERS AND OTHERS - Partners and Contexts*

| STUDY | AUGMENTED COMMUNICATORS | PARTNERS | CONTEXTS STUDIED (Environment or Situation) | COMMUNICATION SYSTEM REPORTED |
|---|---|---|---|---|
| CALCULATOR & DELANEY (UP-1984) | 5 adults (mentally retarded/ physically disabled)<br>Mental Ages: 4.69<br>Living in institution<br>MLU's: 2.05-3.04 | Adult (professional) with shared experiences | Unstructured conversation (nonspecific requests for clarification added) | Direct selection boards (191-229 symbols) |
| CALCULATOR & DOLLAGHAN (1982) | 7 children/adults (mentally retarded/physically disabled)<br>Ages: 8-25 yrs.<br>Living in institution<br>Early pre-operational level (2-3 yrs.) | Teachers | Observation - Natural Environment Classroom - opening segment of school day | Direct selection boards (27, 36, 40, 60, 64, 78 & 150 Bliss symbols)<br>Varied verbal, gestural & sign ability |
| CALCULATOR & LUCHKO (1983) | 1 adult with brain stem injury (acquired disability)<br>Age: 24 yrs.<br>Living in institution<br>Normal intelligence | Open - other residents and staff | Observation - Natural Environment -Nursing home | Idiosyncratic yes/no response<br>Alphabet board (initial)<br>Alphabet board & words & phrases (altered) |
| CHRISTOPULOS & SHANE (IP) | 1 child (twin with developmental disability)<br>Age: 7½ yrs.<br>Receptive language estimate - 3 yr. level | Mother<br>Unfamiliar adult<br>Twin brother | Structured task - Object naming (barrier) | Gesture and some single words |
| COLQUHOUN (UP-1982) | 7 children and young adults with developmental disability<br>Ages: 10-27 yrs. | Familiar adults (teachers, friend mother) | Unstructured conversation | Direct selection of Blissymbols |

## Table 1

STUDIES ON INTERACTION BETWEEN AUGMENTED SPEAKERS AND OTHERS - Partners and Contexts*

| STUDY | AUGMENTED COMMUNICATORS | PARTNERS | CONTEXTS STUDIED (Environment or Situation) | COMMUNICATION SYSTEM REPORTED |
|---|---|---|---|---|
| CULP (UP-1982) | 5 children with developmental disability<br>Ages: 5-13 yrs.<br>Receptive language estimates - 6.4 to 7.8 yrs. | Mothers | Unstructured conversation (in home) | 3 - Blissymbol boards with head pointers<br>1 - Handivoice 110 (synthesized speech, direct selection)<br>1 - Alphabet, word board |
| FARRIER, YORKSTON BEUKELMAN, & MARRINER (IP) | 5 speaking adolescents and adults using communication device<br>Ages: 15-26 yrs. | 5 speaking adults (familiar with users) | Structured tasks<br>-Direction giving<br>-Decision making | Expanded Keyboard Memowriter (direct selection device with alphabet, printer, and LCD display) |
| FISHMAN & TIMLER (UP-1983) | 1 adult with developmental disability<br>Age: 57 yrs. | Speech-Language Pathologist | Unstructured conversation (in Home) | Speech/Vocalization<br>Language board - Direct selection of words, phrases alphabet (limited spelling skills)<br>Pointing/Gestures |
| HARRIS (1978, 1982) | 3 children with developmental disability<br>Ages: 6-7 yrs. | Teachers and other students | Observation - Natural Environment<br>Classroom - Free time activity<br>- Individualized instruction<br>- Small group instruction | $S_1$-$S_3$: Autocom (direct selection of symbols, words; printer and LED screen)<br>$S_1$: Touching, gestures, vocalization, facial, expression, eye contact<br>$S_2$: Gestures, pointing, crying, laughing, facial expressions & eye contact<br>$S_3$: Gestures, vocalizations and eye contact |

## Table 1

STUDIES ON INTERACTION BETWEEN AUGMENTED SPEAKERS AND OTHERS - Partners and Contexts*

| STUDY | AUGMENTED COMMUNICATORS | PARTNERS | CONTEXTS STUDIED (Environment or Situation) | COMMUNICATION SYSTEM REPORTED |
|---|---|---|---|---|
| HIGGINBOTHAM (UP-1982) | 1 adult with developmental disability<br>Age: 57 yrs. | Speech-Language Pathologist | Unstructured conversation (in home) | Speech/Vocalization<br>Language board - Direct selection of words, phrases, alphabet (limited spelling skills)<br>Pointing/Gestures |
| HUSCHLE & STAUDENBAUR (UP-1983) | 1 adult with developmental disability<br>Age: 57 yrs. | Speech -Language Pathologist<br>Unfamiliar adult | Unstructured conversation (in home) | Speech/Vocalization<br>Language board - Direct selection of words, phrases, alphabet (limited spelling skills)<br>Pointing/Gestures |
| KRAAT (UP-1979) | 1 adult with Dystonia (acquired)<br>Age: 46 yrs.<br>Living in institution | Open - Staff and other residents | Observation - Natural Environment (10 Hours) | Vocalization<br>Head & arm gestures<br>Canon Communicator (Direct selection of alphabet letters; printer) |
| LEWIS & RIPICH (UP-1983) | 2 adults with developmental disability | Group: Speech-Language Pathologist Social worker, 2 dysarthric speakers, augmented speakers | Observation - Natural Environment -Counseling group discussion | Blissymbolics (800 symbols; 100 symbols) |

## Table 1

STUDIES ON INTERACTION BETWEEN AUGMENTED SPEAKERS AND OTHERS - Partners and Contexts*

| STUDY | AUGMENTED COMMUNICATORS | PARTNERS | CONTEXTS STUDIED (Environment or Situation) | COMMUNICATION SYSTEM REPORTED |
|---|---|---|---|---|
| LIGHT (IP) | 8 children with developmental disability<br>Ages: 4-6 yrs. | Primary Caregivers (mother, 1 sister)<br>Clinician | Unstructured - Free play (mothers)<br>Structured play context to elicit range of communicative acts | 7 - Blissymbolics (at least 100 symbols)<br>1 - Blissymbols & pictures (4 children - Direct selection; 4 children - indirect selection, using eye gaze to pointing to code symbol) |
| LIGHT, COLLIERS & PARNES (1984) | 1 child with developmental disability<br>Age: 5 yrs. 7 mos. | Primary Caregivers (mother, 1 sister)<br>Clinician | Unstructured - Free play (mothers)<br>Structured play context to elicit range of communicative acts | Direct selection board (205 Blissymbols; 137 picture symbols)<br>Vocalization, gesture & eye gaze |
| LOSSING (UP-1981) | 2 persons with developmental disability<br>2 persons with acquired traumatic brain injuries<br>Ages: 11-28 yrs. | Open - Parents, siblings, teachers & therapists | Observation - Natural Environment (6 hours/subject) | $S_1$ - Eye coding & morse code unit.<br>$S_2$ - Canon Communicator & gesture<br>$S_3$ - Communication board with words, phrases, alphabet & morse code unit<br>$S_4$ - Canon Communicator & gesture |

## Table 1

STUDIES ON INTERACTION BETWEEN AUGMENTED SPEAKERS AND OTHERS - Partners and Contexts*

| STUDY | AUGMENTED COMMUNICATORS | PARTNERS | CONTEXTS STUDIED (Environment or Situation) | COMMUNICATION SYSTEM REPORTED |
|---|---|---|---|---|
| MAC DONALD (UP-1983) | 1 child with developmental disability and severe hearing loss<br>Age: 12 yrs.<br>Ambulatory | Familiar partner | Unstructured conversation (15 mo. period) | Sign vocabulary - 350 signs<br>Blissymbol chart - 400 symbols |
| MARRINER (IP) | 5 speaking college students using communication device | 5 speaking college students | Structured task<br>-shared decision making | Gestures<br>Communication system (7 words/min.) |
| MATHY-LAIKKO & RATCLIFF (UP-1983) | 1 adult with developmental disability<br>Age: 57 yrs. | Speech -Language Pathologist<br>Unfamiliar adult | Unstructured conversation (in home) | Speech/ Vocalization<br>Language board - Direct selection of words, phrases alphabet (limited spelling skills)<br>Pointing/Gestures |
| MILLER & KRAAT (UP-1984) | 1 child with developmental disability<br>Age: 5 yrs.<br>Receptive language level - 3 yr. level | Adult-Familiar<br>Mother | Structured play context to elicit attention-getting behaviors<br>Observation - Natural environment | Eye gaze, arm pointing, vocalization, bangong, head turn<br>Direct selection of picture/ symbol boards (120 symbols) |
| MORNINGSTAR (UP-1981) | 4 adolescent & adults with developmental disability<br>Ages: 15-21 yrs.<br>2 living in institution | 4 dyads per augmented communicator: 2 unfamiliar college students and 2 familiar staff members<br>Total: 8 familiar and 8 unfamiliar adults | Structured conversation<br>-exchange information about movie seen<br>-explain rules of a card game | Blissymbolics |

## Table 1

STUDIES ON INTERACTION BETWEEN AUGMENTED SPEAKERS AND OTHERS - Partners and Contexts*

| STUDY | AUGMENTED COMMUNICATORS | PARTNERS | CONTEXTS STUDIED (Environment or Situation) | COMMUNICATION SYSTEM REPORTED |
|---|---|---|---|---|
| SHERE & KASTENBAUM (1966) | 13 children with developmental disability<br>Ages: 2-4 yrs. | Mothers | Observation - Natural Environment (home) over 7-8 month period | Vocalization<br>Non-verbal behaviors-looking turning, kicking, smiling, laughing, crying |
| SPONSELLER & LAIKKO (UP-1983) | 1 child with developmental disability<br>Age: 11 yrs.<br>Receptive language score - 6 yrs. 8 mos. | 4 familiar staff members:<br>-3 speech/language pathologists<br>-1 occupational therapist<br>4 unfamiliar adults | Structured conversation<br>-watercolor drawings<br>-pictures | Canon communicator<br>Vocalizations and few single words |
| WALDRON, GORDON & SHANE (UP-1980) | 1 adult with developmental disability<br>Age: 34 yrs.<br>Living in institution<br>Normal comprehension skills | Mother<br>College student | Structured task<br>-picture description and listener identification | Direct selection board with alphabet and words |
| WEYLER, BLAU, LESLIE & DORE (UP-1983) | 10 adolescents & young adults with developmental disability<br>Ages: 15-29 yrs.<br>Receptive language scores - 10-18+<br>Spelling skills - 2-11 grade | Familiar adults (staff) | Structured conversation<br>-augmented speakers instructed to prepare four conversational topics | 5 - Alphabet board (direct selection)<br>5 - Alphabet/word, phrase boards (direct selection)<br>Vocalization, speech, gesture |

## Table 1

### STUDIES ON INTERACTION BETWEEN AUGMENTED SPEAKERS AND OTHERS - Partners and Contexts*

| STUDY | AUGMENTED COMMUNICATORS | PARTNERS | CONTEXTS STUDIED (Environment or Situation) | COMMUNICATION SYSTEM REPORTED |
|---|---|---|---|---|
| WEIDER & KORNET (UP-1983) | 1 child with developmental disability & language impairment<br>Age: 10 yrs.<br>Ambulatory | Mother<br>Sister<br>Clinician | Conversation in structured contexts<br>-play<br>-reading book<br>-snack | Natural gestures, facial expression<br>Speech - 1 or 2 words of varying intelligibility |
| YORKSTON, BEUKELMAN & MARRINER (IP) | 10 adolescents and adults with physical disability | Adults | Structured contexts<br>-message transmission tasks | Varies |

## CHAPTER V

## SOME OBSERVATIONS ABOUT COMMUNICATIVE INTERACTION BETWEEN AUGMENTED SPEAKERS AND THEIR PARTNERS

Formal research and observation have given us an initial understanding of communicative interaction between augmented communicators and others. However, in coming to any conclusions, it is important to realize the limitations of our current knowledge. Our information to date is fragmented and incomplete, with many areas of the communication process not having been studied. In addition, the research that has been completed is difficult to integrate and compare for several reasons, among which are the varied and diverse models and assumptions that underlie the research and conclusions, as well as the wide differences in the dyads or groups studied.

To elaborate on some of these concerns: (1) many areas of the communication process have been examined in a single research study or single dyad only; (2) research has primarily addressed a particular group of augmentative communication users (e.g., children and young adults using direct selection, non-spelling systems interacting with familiar caregivers); (3) the augmentative systems used by the persons studied are highly diverse in terms of communication potentials (e.g., a 25-word symbol board vs. a synthetic speech output system capable of novel utterances); (4) the augmented communicators present very different cognitive, language and social abilities, as well as varied speech and non-verbal abilities to communicate through; (5) the research designs use different segmentations and taxonomies to examine discourse and meaning; and (6) the contexts in which observations have been made are highly dissimilar.

Our current data base is further complicated by earlier and somewhat narrower views of communication and device use. In particular, our earlier focus on aid use and the aid user, rather than the multi-modes used in communication and the interaction and influence of both partners on the communicative exchange. This narrower view has given us less information about the behaviors of those interacting with augmented communicators as speakers and listeners. Consequently, the interconnecting and causal relationships between what is said by the augmented speaker and prior utterances are often lost. In addition, studies that concentrate solely on utterances made through a device or language board have ignored the rich, multi-modal aspects of communication exchange in this type of interaction. The conclusions from studies with a narrower focus need to be interpreted cautiously lest they give us a skewed view of the communication process and we derive questionable conclusions about "the aid user".

## Some Preliminary Observations

In the course of the IPCAS study, several global observations were made about augmented speakers and interaction patterns. Of particular note is the variation seen among people who use communication technology, the multiple patterns observed in the persons speaking with them, and the differing potentials for communication that exist within the devices and systems themselves. It has also become apparent that the particular slice of communication experience studied by a particular researcher is not necessarily representative of the interaction patterns of the aided speaker across a series of everyday situations and environments. These general observations are discussed briefly here to serve as a background for the conclusions and observations that follow.

### Aided Speakers: A Continuum of Abilities

During the course of this study, many professionals have commented on the range of interactants found within the group of persons using augmentative communication systems. Some augmented speakers appear to be poor communicators and conversational partners. Others appear to be maximizing their communication options and are judged good conversational partners. A person having access to an alphabet-type system and sophisticated technology may be socially and communicatively isolated with little interaction beyond basic needs. On the other hand, a person with a limited communication system may be interacting with a wide variety of partners with frequency, and participating in that interaction is viewed positively from a social perspective. Another person, through the use of high technology, may be participating actively in conversation, contributing propositionally, and leaving the partner with a feeling of a "normalized conversation". (Personal communication - A. Cook, D. Yoder, K. Galyas, M. Cappozzi, P. Wasson, S. Dashiell, D. DePape, S. Miller, K. Yorkston, H. Shane, N. Marriner, A. Easton, Y. Dajammi).

We seem to be able to identify aided speakers at both ends of the continuum: those who appear to be either competent conversational partners and communicators within the constraints of an augmentative device, and those who are poor communicators and users of these systems. To date, we have not addressed the topic of communicative competency in augmentative communication or looked at the behaviors that differentiate those judged as good or poor interactants. In discussions with professionals, however, it appears that: (1) some of those persons identifed as good partners and interactants are superior from a propositional point of view. That is, they are active linguistic contributors to the conversation. Others are superior from a social point of view. That is, they are highly interactive and this interaction is more social than propositional; (2) persons viewed as highly interactive and good communication partners have varied abilities and capabilities. These individuals may have an acquired disability or may be developmentally disabled. In addition, they may or may not have spelling ability, mobility, residual speech or devices with similar characteristics; (3) a specified number of language symbols or primary use of the augmentative device are not necessarily associated with these judgments (Silverman, Kates and McNaughton, 1978); and (4) this continuum of augmented speakers has been observed in all of the IPCAS countries studied.

This range of aided communicators is discussed in view of the image projected by much of our past research. That image has often been one of the augmented communicator as a poor interactant or system user (Harris, 1978; Calculator and Dolloghan, 1982; Culp, UP-1982; Beuttemeirer, UP-1983; Sponseller and Laikko, UP-1983; Kraat, UP-1979; Blackstone and Cassatt, IP). It is important to recognize that a continuum of competencies appears to exist among augmented communicators, and that behaviors presenting a very different picture have been observed. One must question whether we have been primarily studying some of our less competent users or using methodologies and measures that do not capture these performance differences, or whether we need to investigate more carefully the relationship between specific language and interaction measures and the social perception of the quality of a partner and interaction.

## Conversational Partners: A Continuum of Abilities

It has also been observed that there is a continuum of competencies among able-bodied persons interacting with a person using an augmentative system. Both partners are dealing with unconventional modes of communication. The aided person is attempting to converse through a restrictive system with many altered discourse devices. The partner, on the other hand, is attempting to cope with these differences and trying to communicate with someone using a unique mode of communication.

The natural speaker may be quite competent in communicating and interacting with other able-bodied persons. However, in this exchange, he or she is faced with a communication situation which requires different technical and pragmatic skills. Effectively communicating with an augmented speaker may require a knowledge of idiosyncratic signals and gestures, separating intentional from unintentional movement, or participation in the technical aspects of message formulation. The partner is also faced with many new pragmatic problems in the conversational exchange. For example, how to carry on a conversation with someone using technology, speaking at a very slow rate and using unconventional turn-taking signals. In addition, the augmented speaker may or may not be able to project the usual behaviors that provide the partner with a perception of his or her probable cognitive and experience level.

People vary in the ability to adapt to this difference at both a technical and conversational level. Some partners experience a great deal of difficulty in communicating with augmented speakers. A spouse and an aide may both try to use a yes/no question strategy to resolve a communication breakdown, yet one is successful and the other is not (Beukelman and Yorkston, 1980). A casual acquaintance may have difficulty establishing the appropriate level for communicating to an augmented person and therefore talk down or shout at them, or turn to another person to channel the communication through (Creech, 1981; Vigianno, 1981; Holmquist, 1984). A person unfamiliar with the multi-modal aspects of this type of communication may only attend to messages produced in a conventional manner on a language board and ignore non-verbal behaviors and unique board strategies (Morningstar, UP-1981). A partner may feel uncomfortable, not know how to interact in this unconventional mode, and therefore not offer the augmented person an opportunity to participate in a conversation (Blackstone and Cassatt, IP; Barker and Henderson, IP).

Other able-bodied persons demonstrate more competence in interacting through augmentative modes. Some partners skilfully use a series of questions to effectively construct a communication intention for their aided partner (Colquhoun, UP-1982). Or, they use prediction and verification successfully to facilitate a rapid communication exchange (Waldron, Gordon and Shane, UP-1980). It is important to recognize able-bodied partner differences when examining the communicative process between aided persons and others. The competencies of two persons are involved. The particular dyad studied may have a poor or competent interactant as the natural speaker. This obviously influences the behaviors we see.

## A Variety of Communicative Styles

Augmented communicators and natural speakers are people. As with all individuals, they have very different communication styles. Some persons are highly sensitive to their partners and make a concerted effort to react, to balance the participation and to negotiate an exchange. Others approach the interaction with a much more autocratic, egocentric or controlling manner. This has been observed in verbal interaction patterns between able-bodied adults and children (Rees, 1978; Prutting, 1982; Labov and Fanshel, 1977; Corsaro, 1979). It is not unusual, then, that different interaction styles appear in augmentative-natural speech interactions.

Several illustrations of this variation among dyads appear in the research studies to date and have been observed by professionals working with non-speakers. In Light's study (1985) of mother-child interaction, one dyad was observed in which the mother never responded to the child's initiations or agenda and continued with her own script throughout the play situation. Blackstone and Cassatt (IP) also noticed one dyad in which the mother never gave the child an opportunity to respond. In other instances, augmented speakers have been observed to control the communication situation by continuing to print multi-sentence utterances in a conversation or talking exclusively and extensively about egocentric topics (Personal communication - Okun, Fishman, Sitver-Kogut, Shane). These interactions are often more like monologues than dialogues. Dyadic differences were also noted by Farrier et al (IP) in their study of interaction patterns when one partner simulated an augmentative role. In one dyad in particular, the person using the communication device took a much more controlling posture, (e.g., communicating in more length and detail), while the partner took a relatively passive role (e.g., not attempting to predict, waiting, etc.).

Interactions have also been observed in which the two partners appear more sensitive to each other and mutually effect a successful interchange. This may be done in several ways. A partner may respond to an augmented speaker's communication effort by commenting or expanding on it (Weiner and Kornet, UP-1983), or balancing topics and contributions. One parent of a young physically disabled child may elaborate and expand on her child's vocalizations and gestures, while another parent may not (Shere and Kastenbaum, 1966). In an exchange, one able-bodied partner can ask a series of questions and quickly actualize the utterance for a non-speller. In another, the able-bodied partner can ask a series of questions that are not productive and have a negative effect on the conversation and communication. Of particular interest to the study of augmentative communication are the variety of interaction patterns that are used, and the impact of those patterns on the effectiveness of communication for both partners.

In understanding augmentative communicators and interaction patterns, we need to be aware of the variations and stylistic differences that occur between people. The words "augmented" and "others" only refer to the primary mode of communication used. Within each of these umbrella groupings are people of very different personalities, abilities and adaptive styles. We need to be very cautious about making statements about group behavior from the observations of a few specific dyads.

## Range of Pragmatic Possibilities Within Systems

Several of the communication differences between natural speech and augmentative communication forms have been outlined previously. The rate of communication, the amount of vocabulary and the output modes available necessarily impact on the nature of the interaction process. This interaction is further influenced by the aided speaker's residual or dysarthric speech, and altered non-verbal behaviors. The inherent differences among augmentative systems needs to be considered when attempting to make general statements about conversational interaction between augmented communicators and others, or statements about the nature of augmentative communication. The intersystem differences are many, and their pragmatic impact is important to recognize (Buzolich, 1984; Wexler et al, UP-1983; Goosens and Kraat, 1985; Beukelman and Yorkston, 1980, 1984; Calculator and Luchko, 1983).

Depending on the specific augmentative, vocal and non-verbal system available, a child or adult may have very different conversational potentials. These, in turn, influence what can be said, to whom, how and when. For example, to gain a partner's attention to communicate, one aided speaker may have inconsistent and weak vocalization and uncoordinated arm movements. Another person may have a synthetic speech device and can gain a person's attention while simultaneously beginning to communicate (e.g., "Got a minute?"). One would guess that the person with the speech output device could summon a listener more easily and effectively than the first. The vocabulary available to a particular user also influences the interaction. For example, two 5-year old children with a 100-symbol vocabulary may have very different abilities with regard to what topics they can introduce, the variety of intentions they can express, and how these can be communicated. One child may have a high percentage of specific nouns in the array which are related to such topics as the weather, toys and food. This child may not have social greetings or words to ask questions with, vocabulary items that lend themselves to a variety of topics and meanings, and wording/vocabulary at his age and ability level (e.g., "Can I have another soda?" vs. "More drink."). The other child may have symbols that allow him to express a variety of intentions at age level (e.g, social greetings, asking questions, teasing and commenting), and be able to give topic hints to introduce new and multiple areas of interest. The interaction patterns that we do and do not see are influenced to some degree by what each five year old child has available to express himself with.

In examining augmentative communication systems further one sees a host of differences from one to another in relation to what is conversationally possible, different, and difficult. A few examples include: 1) the degree to which a partner must be actively involved in the technical aspects of an aided person's communication efforts; 2) the degree of independence and control available to the aided speaker in speaking; 3) the rate at which sentences or words can be spoken; 4) the vocabulary available through which to create a proposition and intention; 5) the flexibility within that vocabulary to alter wording for different listeners and contexts; 6) the ability to communicate at a distance; and 7) the understandability of these communication modes to a broad spectrum of people. Interaction processes need to be examined in light of what is available to a given augmented speaker to communicate with, as well as how he or she chooses to use these options in a social situation.

## The Influence of Partner and Context on the Nature of the Interactions Observed

Research on the interactions of able-bodied speakers has shown that the nature of a person's contribution to a conversation can vary greatly from one social situation to another, from one physical context to another and from one partner to another (Gallagher, 1983; also see Chapter II of this report). It seems quite probable, then, that the communication behaviors of a person using augmentation would also vary among people and contexts. However, to date, much of the research conducted has examined interaction of a single dyad or a group of dyads in one context (e.g., talking to each other under observation, conveying information). We have less frequently looked at communicative patterns of a particular augmented speaker across several partners or in different situations. The influence of partner and context is important to the interpretation of our research findings and our understanding of this type of communicative interaction.

Some beginning evidence that persons using augmentative means communicate differently across contexts and partners appears in several unpublished and published studies to date. A few researchers have examined the same dyad (augmented speaker and partner) in a variety of tasks and environments to note the influence of the task itself on performance. Wieder and Kornet (UP-1983) observed a multiply handicapped child and his partner in a manipulative play task, story reading and snack time. These contexts produced a different proportion of communicative acts and mode use. Although response functions were high across all contexts, they were greatest in the play task. Twice as many performatives occurred in the snack context than in any other situation, and a greater number of requests occurred in the manipulative play situation. The least amount of communicative interaction was observed in the snack time. Preliminary data from the study by Farrier, Yorkston, Beukelman and Marriner (IP) also suggests that the type of communication task being negotiated may influence the behaviors observed. In their study of the same dyads in a direction-giving and a decision-making task, a greater number of words and partner obliges were noted for the direction-giving task than the decision making task. Harris (1978) also noted different levels of interaction in the three contexts studied in the classroom: free play, group and individual instruction. The greatest amount of interaction and AutoCom use occurred in individual instruction, as opposed to the other contexts.

Other researchers have been interested in the effect of the partner on the behaviors observed in the augmented child or adult. That is, given the same general or specific communication context, how do behaviors differ when the partner is different. In the Wieder and Kornet study (UP-1983), the subject was observed in the same contexts interacting with his mother, his sister and the clinician. The boy's behavior varied across these partners with regard to the mode used, the type of intentions expressed, and his participation in the conversations in the same context. He was able to regulate the conversation to a greater degree with his sister; used fewer response functions with the sister and clinician as opposed to his mother; used speech more often with his mother than others; and initiated more requests and comments in interactions with his sister and the clinician.

Bailey and Shane (UP-1983) also examined differences in interaction patterns between one subject and familiar partners in a structured and open ended conversation. Many differences were observed when a 13 year old interacted with his mother and with his school aide. These included differences of mode (board use only occurred with the aide), the success of communication attempts (the aide was more often successful), the appropriateness of the subject's feedback (poor to the mother), and the extent to which efficiency strategies were used.

The differences in interactions with a variety of partners has also been observed by Beukelman and Yorkston (1980). In their study of an adult's interactions with four partners, they observed that different modes of communication were being used with different frequency with the therapist, aides and husband. Speech was used for

78% of the interactions with one of the aides and infrequently by the therapist; a communication device was used 67% of the time with the therapist and 30% of the time with the husband. The exchanges with these familiar partners also varied with respect to the functions expressed, the number of communicative breakdowns, and the type and success of the resolution strategies.

Other researchers have addressed the differences in interaction patterns when the augmented speaker is communicating with a familiar versus an unfamiliar partner. In general these studies have observed that greater difficulties are encountered by persons unfamiliar with augmented speakers and their techniques. Researchers have also observed how an augmented speaker does or does not shift communicative style to accommodate an unfamiliar partner. Again, these different partners have often produced divergent interaction patterns and data. Unfamiliar partners may ignore non-verbal communicative behaviors and interrupt more frequently (Morningstar, UP-1981); they may be less successful at guessing or not use this strategy; and they may receive and repair conversations more slowly and less successfully (Huschle and Staudenbaur, UP-1984; Waldron, Gordon and Shane, UP-1980). Some aided speakers may shift styles to accommodate these new listeners and their problems, while others do not. The Blissymbolics users studied by Morningstar (UP-1981) were observed to use more syntactical form in speaking with less familiar partners. The subject studied by Waldron, Gordon and Shane (UP-1980) did not change style for his partners. In contrast, Sponsellar and Laikko (UP-1983) found very few familiar-unfamiliar partner differences in communication performance on their measures in the interactions during highly structured tasks (e.g., talking about pictures). This may be a result of the tasks they presented, the measures they used or the characteristics of the two partners involved.

Additional variances have been observed in augmented speakers' behaviors across different environments with multiple partners. Of particular interest is the study of Andrews (UP-1980). Marked differences were noted between children's performances in speech treatment sessions and in the classroom. Among other observations, the frequency of modes of communication and communicative acts varied between the two situations (e.g., board use was greater in treatment; non-verbal modes were most frequently used for the imperative function in the classroom and the declarative function in treatment).

These preliminary observations suggest that some of the interaction and language behaviors observed are tied to contextual parameters, and may not be consistent across environments, partners and communication situations. Consequently, one must be cautious about making generalizations about a person's communication behaviors from a given interaction sample. The inter-relationships of partners, contexts and augmentative behaviors needs further study.

## The Density of Social Interactions

Augmented communicators and professionals have observed the reduced levels of interaction that take place between aided speakers and others in everyday environments in comparison to their able-bodied counterparts. Augmented speakers appear to interact less frequently, have fewer partners and participate less in many of the exchanges that do occur. Some of the observations made by participants and researchers in the study include: 1) reduced peer interaction (Harris, 1978; Jolie, UP-1981); 2) long periods of no communication exchange (Kraat, UP-1979; Beuttemeirer, UP-1983); 3) a high percentage of interactions taking place with persons having a mandatory rather than a voluntary relationship with the aided speaker (Richardson, 1969); 4) short exchanges within those interactions (Calculator and Dolloghan, 1982; Harris, 1978); 5) greater social interaction than propositional exchanges; and 6) reduced expectations for participation on the part of able-bodied persons.

As noted earlier, these observational patterns may not apply to all augmented speakers. During the IPCAS project some persons have shared observations about meaningful social and communication relationships between augmented persons and their peers on a ward, in the home or in the classroom. Augmented persons have also been observed to interact quite extensively with a variety of partners. (Personal communication - B. Pudler, J. Eulenberg, M. Sitver-Kogut, M. Cappozzi, A. Easton, D. Yoder, D. DePape, J. James, M. Smith). It is suspected, however, that the social interaction experiences shared by these persons may be in the minority. It is also important to put our observations and studies in perspective by simultaneously examining the social interactions of speaking persons in the same environments.

To date, six studies have looked at the density of communicative interactions within everyday environments. These studies provide us with some preliminary information about who is interacting with augmented speakers, and the quality and level of those interactions in natural environments. Our current information is based on 22 augmented speakers and their partners under observation in institutions, homes and classrooms.

Two adults with acquired disorders and spelling capabilities have been studied in institutional environments. The subject studied by Calculator and Luchko (1983) was observed for a total of 20 hours across 5 treatment phases. The average number of speaking turns for the subject and her partner per 4-hour segment was 187. Less than 5% of these interactions were with other residents of the nursing home. Kraat (UP-1979) observed an adult over a 10-hour period in a large institution. This adult was observed to interact with 9 caregivers and no residents, and participated as the speaker 112 times within the 10-hour period. This subject experienced less interaction than Calculator and Luchko's subjects. This may be due to subject differences and/or the time segments studied during the day. Beuttemeirer (UP-1983) observed even less interaction in her study of young mentally retarded adults in their group home and school environments. Sixteen hours of observation were required to code 72 interactions for the 5 subjects studied. The study coded 10 interactions for each of the subjects in the home environment and for 2 of these subjects in school.

Both Lossing (UP-1981) and Beukelman and Yorkston (1980) have tabulated the number of interactions occurring with adult non-speakers using alphabet systems in the home. During the two 8-hour samples studied by Beukelman and Yorkston, the communication events/hour averaged 5.1 for the alphabet board condition and 2.7 for the typewriter condition. In Lossing's data, augmented speakers averaged 13 to 29 exchanges per hour over a 3-hour period. However, she observed that there were wide fluctuations across these 3-hour periods (e.g., S2 had no exchanges during the first hour; S1 had only 2 exchanges during the third hour of observation).

Studies of communication patterns in the classroom suggest that more interactions may occur in the classroom when compared to home and institutional settings. Calculator and Dolloghan (1982) found a mean of 102 communicative acts per half hour across the 7 children studied during an active, opening class sequence in the morning. Harris (1978) found the number of interactions involving 3 children using an AutoCom to vary across the contexts studied: free time, individual instruction and group discussion. The total time period observed per child was between 3.3 and 3.9 hours, with some variation in the time allotted to each sub-environment. The children averaged 12 to 18 turns in free time, 62 to 87 turns in the individualized instruction, and 35 to 55 turns in the small group. Harris also noted that peer interaction infrequently took place in these classroom contexts (e.g., never for S1, and on a motoric vs. communication level for S3).

Several researchers have noted the short length of these exchanges (e.g., over 2 to 4 turns) and the reduced communication level and participation required of the augmented speaker. Harris (1978) reported that many of the exchanges between children and their teacher were "purposed" and did not appear to lend themselves to extension. Several of the augmented speaker turns observed in everyday environments were acknowledgements (yes/no), social greetings or single word utterances, frequently in answer to direct questions (Harris, 1978; Kraat, UP-1979; Calculator and Luchko, 1983). In the studies by Lossing (UP-1981) and Beukelman and Yorkston (1980), more variety in the types and levels of utterances by the augmented speakers was noted. Comparison between these studies is difficult, however, due to the differences in functions tabulated and how these functions were defined. In addition, there were differences in the definition of a turn or an exchange, and the degree to which non-verbal behaviors and social interactions were tabulated.

The density of social interactions appears to be influenced by several factors. Among those mentioned and observed are: 1) the willingness of the partner to listen and comment (Personal communication - J. James); 2) training of the aided speaker and partners (Calculator and Luchko, 1983; Harris et al, 1979; Jolie, UP-1981); 3) the use of opportunities by the aided speaker (Light, 1985; Farrier et al (IP); Personal communication - R. Creech; 4) expectations or lack of them on the part of able-bodied persons (Turner, 1981); 5) the communicative style of the augmented speaker; and 6) the characteristics of the device itself (Personal communication - M. Williams). It is also important to note that observations of interaction made in a training session may not parallel the communication behavior observed in more natural environments (Andrews, UP-1980; Calculator and Luchko, 1983; Calculator and Dolloghan, 1982; Kraat, UP-1979; Personal communication - A. Easton, S. Dashiell, N. Marriner, S. Calculator, D. Yoder).

## The Negotiation and Exchange of Meaning

How is meaning negotiated and exchanged when one partner in the conversation is using an augmentative system? What do we currently know about what augmented speakers say and how they say it? What levels and complexities of meaning and discourse are possible for an augmented speaker? What observations have been made about the use of language by the able-bodied partners in these exchanges? What problems are encountered in conveying meaning and participating in these conversations? At this point, there are many questions and few answers. However, observations and research efforts have provided us with some initial insights about the negotiation and exchange of meaning.

For the purposes of this study, meaning will be examined along the following dimensions: 1) gaining attention to communicate a proposition or utterance; 2) establishing topics; 3) the production of an utterance; 4) the form and content of propositions and utterances; 5) communicative intentions or functions; 6) conversational structure; and 7) problems encountered in establishing and exchanging meaning. When possible, the influence of device characteristics and the strategies that both partners use to negotiate meaning will be shared. Needless to say, the study of meaning is complex and multi-faceted. What is presented here attempts to encompass our current observations and knowledge base.

### Getting Attention to Communicate

Gaining the attention of a partner is an important prerequisite to any communicative interaction (Keenan and Schieffelin, 1976). Able-bodied speakers accomplish this in a variety of ways: by speaking, physically going over to the partner, presenting a physical object, touching or tugging, or gesturing. One might also use such devices as calling the name of the partner (e.g., "Eric," or "Look Mommy!"). At times, we may already have the attention of another through mutual eye gaze.

Many of these linguistic and non-linguistic devices may not be available to non-speaking and physically disabled children and adults. That is, a child or adult with an augmentative system may be unable to go over to a partner, physically present an object as an attention-getting signal, or speak intelligibly enough to simultaneously communicate and gain the listener's attention. The ability to easily gain attention may create difficulties for the augmented speaker who tries to initiate a communication, or gain attention in order to take a turn within a conversation. Consequently, the act of gaining attention to communicate often requires unique devices.

Each augmented speaker has a repertoire of behaviors available through which to gain communication attention. The repertoire may include a buzzer, weak or loud vocalization, tongue clicking, arm gestures or eye pointing toward a scan chart. Persons using synthetic speech devices or those with sufficient speech may gain attention through speaking. These behaviors, in turn, must be used to gain a potential listener's attention when that partner is at various distances from the aided speaker and either looking or not looking. Those partners may also be actively engaged in other activities, and/or the noise level in the room may be high.

Miller and Kraat (UP-1984) examined the attention-getting behavior of a five year old child in a structured context. This particular augmented speaker demonstrated the ability to shift attention-getting modes across environmental conditions, and was successful in gaining the attention of his partner 79% of the time. Of note was this child's persistence in unsuccessful attempts, and actions on the part of the child that were mistaken by the familiar partner as attention-getting behaviors when they in fact were not. Light (1985) reported that vocalizations were the most frequent means of gaining attention in her subjects.

Several researchers have noted that children's efforts at initiating communication have frequently gone unrecognized or unacknowledged by partners (Calculator and Dolloghan, 1982; Blackstone and Cassatt, UP-1983; Light, Colliers and Parnes, 1984; Light, 1985). Several anecdotal reports and observations have been made of augmented speakers' difficulties in gaining attention from potential partners. These include problems in getting a partner to look at a printed strip with a message written on it (Beukelman, Yorkston and Dowden, 1985), a misreading of arm gestures or vocalizations as non-communicative, and an inability to vocalize loud enough to gain attention in a particular environment. Further research is needed to understand the degree of the problem and the modes that are most likely to produce a communication to a partner under various circumstances.

### Establishing Topic

In communicating a meaning and intention, both partners must understand what the shared topic is. Sometimes this is negotiated through the linguistic message itself (e.g., "I'm going to the store"); a commonly shared activity or object (e.g., "He's not going to be re-elected" said while watching the evening news); a non-verbal gesture (e.g., gesturing toward an attractive person sitting at the next table); or the topic has already been established in previous utterances. Of particular interest here are how new topics are introduced in augmentative interactions and the nature of those topics.

No formal studies have specifically examined the topics introduced by pre-spellers or how they are established and negotiated. It has been noted, however, that the majority of topics occurring in these interactions are introduced by the able-bodied partner (Light, 1985; Calculator and Dolloghan, 1982; Culp, UP-1982). An exception was noted by Light (1985) in which one child in a play interaction initiated more topics than his mother. Several observations of how topics are established by augmented speakers have been made by professionals participating in this study and will be reported here.

In the case of the child or adult who is not a speller, the number of language items and the available content obviously have an impact on how and what topics might be introduced. Clinicians have observed that the non-speller may attempt to establish topic through eye-pointing, gesture or available symbols. If acknowledged by the partner, this sets in motion a negotiation about what the topic of communication is. If the topic of conversation is an object or action in the immediate environment or is represented directly by a symbol or sight word in the augmentative device, the topic of the utterance may be quickly established. However, often the topic cannot easily be represented by available linguistic and environmental support. The child or adult must then decide whether to attempt to introduce the topic at all and, if so, how to give the listener cues about the nature of the topic.

In order to cue a topic indirectly, children and adults have been observed to eye-point or gesture to a place, person or object that is associated with the topic they are trying to introduce. This might be looking to the window to indicate the topic of "going somewhere", gesturing to a place on the floor where a record player was a few days ago to talk about a record or, looking at a glass to establish breaking in order to talk about someone "breaking up". Such contextual cues may or may not be successful in negotiating the topic with partner. Take the following example:

Child: (Points to the door and vocalizes)
Adult: "You want to go out?"
Child: (Shakes head no; points to door again)
Adult: "You want to be milk monitor?"
Child: (Shakes head no; points to door again)
Adult: "You need to go to the bathroom?"
Child: (Shakes head no)
Adult: "I don't know what you want. Do you want to go out?"
Child: (Shakes head no and turns away)

Harris (1978), p.148

In this interaction, the topic and utterance the child wished to convey ("Who came in the door?") were not actualized. The partner was not able to establish the topic associated with looking at the door. In other instances, a topic cued through an object association might be understood.

Symbols have been observed to be used in the same manner. For example, a child wanting to talk about something to do with balloons or having a snack may indicate this by pointing to the symbol for "McDonald's" on his board (Yoder and Kraat, 1983). In this situation, the partner must first establish that the person is not talking about McDonald's, and then search for the related topic. Persons have also been observed to put the topic responsibility totally on the partner. For example, a person may get a partner's attention and indicate that they have something to communicate, and then look to the partner to start establishing the topic through guessing. It is probable that this occurs when no linguistic or non-linguistic support is available, or with an augmented speaker who uses available cues poorly.

The success that two people have in negotiating and in establishing the topic of an augmented speaker's utterance appears to be related to several variables. In discussions with professionals and family members the following factors were suggested as being related to success: (1) the mode used; (2) the amount of shared information between co-participants; (3) the partner's skill in asking information-producing questions; (4) the relationship of the topic to available linguistic and environmental cues; and (5) the partner's willingness to pursue topic identification. It has also been suggested that topic shifts within a conversation are more easily negotiated when the aid user can indicate the shifting through symbol use. For example, "Can I change the subject?", or "new topic/idea".

Augmented speakers who have more elaborate linguistic systems and/or spelling capabilities appear to have minimal difficulty in establishing a topic. As with able-bodied adults, multiple modes may be used to establish a topic. Observers have suggested that the mode used may be selected for efficiency (e.g., using eye-pointing or gesture vs. language), privacy or clarity, given the slowness of this type of conversation in relation to ongoing events. The few studies that have examined the communication between an augmented adult speaker with spelling abilities and other adults have not noted a large imbalance in the number of topic initiations from both partners (Beukelman and Yorkston, 1980; Lossing, 1981; Buzolich (Condition I), 1982).

Little is known about the types of topics that are introduced by an augmented speaker or selected by able-bodied partners for conversations with the augmented partner. These may be similar or dissimilar to topics shared by able-bodied persons. Lossing (1981) and Fishman and Kerman-Lerner (1983) both examined the topics discussed by adolescents or adults and caregivers with a particular interest in the percentage of interactions that dealt with needs and self-care. In the four persons with augmentative systems studied by Lossing, only six instances of communication involving self-care and personal management were observed, even though the subjects reportedly needed assistance for 85% of daily activities. In contrast, the study by Fishman and Kerman-Lerner reported these topics to be the ones most frequently communicated in their four institutionalized subjects. This difference may be due to the living situations of these two groups, the severity of their disabilities or the time segments studied. Both of their studies examined augmented communicators with spelling abilities.

Colquhoun (UP-1982), Light (1985) and Sponsellor and Laikko (UP-1983) have observed that "rhetorical" or "test" questions were often asked by able-bodied partners in their interactions with augmented persons. According to Colquhoun, "rhetorical questions" are questions in which the answers are known to both partners. These researchers were all studying aided speakers who were primarily non-spellers in a structured observation. Sponsellor and Laikko noted a greater use of rhetorical questions with the unfamiliar partner than with the familiar interactant. Light observed that 60.4% of the interactions involving use of the communication board in mother-child interaction were test questions. It is suggested that these rhetorical questions are used to ensure a successful exchange, provide the natural speaker with a communication partner and conversational structure or are dictated by the lack of available vocabulary for other types of exchanges.

## Producing an Utterance

If a natural speaker wishes to say "I get very angry about that", or "Can you pick up a loaf of French bread?" these statements or questions can be actualized very rapidly through clearly articulated speech, with the desired stress, pausing and intonation pattern included. Within a speech act framework, Searle (1969) and Austin (1962) have referred to these productions as "utterance acts" (i.e., the act of uttering or presenting an intention). In communicating, an utterance carries both a propositional meaning (e.g., form and content), as well as a purpose or intentional meaning (e.g., how the speaker wants to affect the thoughts or actions of the listener). Propositional and intentional meanings expressed in augmentative communication will be discussed in subsequent sections. Of interest here is the process of producing those utterances when one partner is an augmented speaker.

An Overview In some instances, an augmented speaker may be able to produce an utterance rather quickly, effectively and completely. Some examples are those situations in which an aid user is able to rapidly retrieve pre-stored sentences and have them appear on a screen for the partner; quickly answer a "Wh" or yes/no question with a head nod or symbol; or speak a social greeting such as "How are you?" in a predictable context which makes dysarthric speech understandable.

There are many situations, however, in which the augmented speaker has difficulty producing a complete and intelligible utterance, independently and quickly. Consider a situation in which an aided speaker may want to comment and tease someone by saying, "You know, you are a real turkey!" or ask a question such as, "Do you know how much a Commodore computer costs?" when these sentences are not pre-stored and readily available. If the speaker is a speller or has the words available, this utterance may be constructed slowly and then presented to a "listener" through a printed tape, a visual display of some sort or synthetic speech. The "speaker" must gain the attention of the intended receiver to the printed display or speak the utterance. In either case, unless the message is prepared in advance, the utterance is constructed slowly. If synthetic speech is used as a communication mode, the message may be of reduced intelligibility, and without the prosodic features of natural speech. If the speaker does not have an independent aid, or chooses to involve the "listener" in the construction, the partner is needed as an active participant in the actualization of that utterance. In this case, the partner must visually or auditorially note each letter in whichever manner it is indicated and re-construct the message.

Actualization is much more difficult if the aided speaker is a non-speller and all the necessary words are not available. In this case, the augmented speaker must somehow negotiate his or her meaning with the partner and actively engage the partner in the production process. The augmented speaker might use non-verbal gestures, facial expressions, vocalization, and any linguistic and other resources available. For example, a child might call a friend a turkey by using facial and body gestures to indicate a bird flapping wings and/or by looking at a picture of a turkey on an animal chart in the classroom (Personal communication - Ann Goetz). To inquire about a Commodore, a speaker might point to the symbols for "similiar to" + "t.v." + "C" +"buy" on a Blissymbolics communication system and hope the listener can figure out his meaning and intention. This obviously takes time, a series of questions and much negotiation.

Several strategies are used by aided speakers and their partners to quickly and efficiently actualize an utterance. Some of these strategies and negotiations effectively bring an utterance to a realization sooner than others. Some lead to miscommunication and/or impact negatively on the interaction process. Regardless of the strategies used, aided speakers often experience difficulty in producing utterances fully, effectively and quickly.

The Role of the Listener The person who is the conversational partner of an augmented speaker often needs to take on roles that are atypical in natural speaker exchanges. They may need to become active in the technical aspects of the augmented speaker's utterance; participate in the definition of the propositional content and intention; and become involved in the resolution of communication breakdowns which normally would be handled by the other partner. Some of the behavioral manifestations of the altered listener- speaker role are discussed below.

A person who has the ability to spell and is using an alphabet board to communicate illustrates how different the process of asking a question or giving information might be in this mode. The aided speaker points to a letter, this is acknowledged by the partner, then another letter is pointed to, acknowledged, and on and on. In this exchange, several turns may be needed to construct a short utterance and the listener becomes an active participant in that construction. An example of this type of exchange is given by Marriner et al (UP-1984) in Appendix D. In this example, the response "a new wallet" required 19 conversational turns, and about one minute to accomplish. A similar pattern may be seen in conversations of non-spellers with rather large vocabulary stores. That is, one word is indicated and acknowledged and repeated by the "listener", a second word is indicated and repeated by the "listener", and so on. Again, the listener does not receive a completed utterance and then reacts, but must first actively participate in its formulation.

Several researchers have noted the multiple turn sequences needed to co-construct some utterances for the augmented speaker (Harris, 1978, 1982; Light, 1985; Wexler et al, UP-1983; Marriner et al, UP-1984). In performing interaction analyses, these construction behaviors and turns have been viewed differently by researchers. These behaviors have been termed "technical" (technical message preparation) by Marriner et al (UP-1984) to differentiate them from whole communicative acts or utterances. Light (UP-1985) codes these co-constructing turns as "procedural plays", and like Marriner et al, analyzes the composite propositional utterance as a whole, rather than each turn used to actualize the utterance. In the research done by

Wexler et al (1983), communicative acts that occurred over several turns were coded as "composite acts" in contrast to communicative acts that were accomplished within one turn. These researchers further observed that a larger number of composite acts occurred when the augmented speakers were using an alphabet board as opposed to a "no-board" condition. They suggested that augmented speakers attempted more complex communicative acts when having access to the alphabet board, and this required multiple turns to formulate.

If the augmented speaker is not a speller or has limited vocabulary available, he or she may not have the words available to produce a desired utterance. In this case, the partner must actively negotiate with the augmented speaker to establish the form, content and purpose of the message. In addition the partner must assist in the technical transfer of information. Note the following example of a communication effort between a caregiver and aided partner when the augmented speaker has a 50 item word board and limited gestures:

> Aided Speaker: Home (language board)
> Partner: "Home? What about home? Something about your sister?"
> Aided Speaker: (gesture - no). Day of the week.(board)
> Partner: "Sunday? Monday? Tuesday? ...Saturday?"
> Aided Speaker: (gesture - yes)
> Partner: "Something about home and Saturday. Are you going home on Saturday?"
> Aided Speaker: Man (board)
> Partner: "A man? Someone special is coming?"
> Aided Speaker: (gesture - no)
> Partner: "I should find out who this man is?"
> Aided Speaker: (emphatic gesture - yes)
> Partner: "A relative? A friend? Someone in the Hospital?"
> Aided Speaker: (gesture- yes)
> Partner: "Someone in the Hospital. Let me see, a doctor? a therapist? a friend? Can you give me another hint?"
> Aided Speaker: (Eye points to top of partner's head)
> Partner: "Head. Part of the head? Brains? He works with the head?"
> Aided Speaker: Color (board) ....
> (Kraat, 1980)

This particular exchange continued over 100 turns and 20 minutes until the question, "Can Carl (a security guard) possibly take me home on Saturday with the Hospital van?" was formulated through the efforts of both partners. In this instance, the aided speaker had a limited linguistic system available and was attempting to communicate a difficult proposition with few cues available.

This exchange ended in communication success. However, with limited language systems, two people are not always able to negotiate a difficult utterance. Sometimes it is never completed, or it is not completed in the same way as the aided speaker intended (Light, 1985; Light, Collier and Parnes, 1984; Bailey and Shane, UP-1983). Both the aided speaker and the partner are in a difficult communication position. The aided speaker is dependent on the guessing abilities and cooperation of the listener in order to communicate. Partners vary greatly in their ability to co-construct with an augmented speaker as well as in the amount of shared information they have available. During this study, questions were raised by professionals as to whether or not the predominance of adult-child versus child-child interaction is partially related to the skills required of a communication partner when interacting with persons using limited linguistic systems.

The Rate of Communication Recent technological advances have provided some augmented speakers with access to stored phrases that can be produced in "real time", or the capability of creating an utterance before an interaction begins. Rather rapid utterances can also be produced by augmented speakers in response to specific questions or by using a single word. These "quick" participations may be a head nod, pointing to a place or object, a facial expression, or indicating a single word or phrase stored in a communication device. Utterances that have more propositional content or that require a longer production time are produced at a reduced rate of communication.

Although the rate at which communication can be transmitted through technical devices is continually increasing, linguistic communication is often extremely slow (Vanderheiden, 1983, 1984; Yoder and Kraat, 1983; Foulds, 1980). Most of the reported production rates have been tabulated on persons using letter by letter spelling to formulate an utterance. Rates of between 3 and 7 words per minute have been reported for persons using a direct selection technique to select letters or codes to represent letters (Beukelman and Yorkston, 1980; Beukelman, Yorkston and Dowden, 1985; Calculator and Luchko, 1983;; Foulds, 1980, McDonald, Schwajda, Marriner, Wilson and Ross, 1982). These rate measurements are based on 4 to 5 letters per word, with most reported rates falling below 12 words per minute. One of the highest communication rates has been reported by Al Cook (Personal communication), who tabulated a communication rate of 26 words per minute for an adult user of the HandiVoice 120, a 3-digit coded system with stored words and individual phonemes. This particular user is able to generate communication at this rate using approximately 65% stored words and 35% phonemes via a 3-number code. Single switch scanning devices have reported letter by letter rates of between 2 and 4 words per minute (Foulds, 1980; Weiss, 1983). These rates can be further increased through the use of enhancement techniques (provided by technology or partners). However, little data is currently available on speaker rates given these facilitation techniques.

Communication rates can be further reduced by the rate at which the "listener" can receive language elements. Several differences in rate have been observed between persons who are familiar with a user as opposed to those with less familiarity with the system and the user (Waldron, Gordon and Shane, UP-1980; Rosen and Durkee, 1978). Beukelman and Yorkston (1980) also observed that one of the aided speakers they studied pointed to letters on an alphabet board too rapidly for a listener to process and retain, and this caused communication difficulties. Although there are no reported rates for persons using whole word systems or restricted vocabulary sets, communication through these systems has also been observed to be extremely slow. The rate of communication in these situations is the cumulative result of the user's production rate, the understandability of the message and the collaborative efforts of the partner in determining the utterance.

Communication at 2 to 12 words per minute is far below that reported for natural speech, 126 to 172 words per minute (Perkins reported in Foulds, 1980). It has been suggested that these severely reduced rates of communication have a profound effect on what can be effectively communicated by the augmented speaker, what is actually said, and the patterns of communication that have been observed in device users and their partners (Vanderheiden, 1984; Kraat, 1982; Harris, 1982; Shane et al, 1982; Yoder and Kraat, 1983).

The work of Chapanis and his colleagues (Ochsman and Chapanis, 1974; Chapanis et al, 1977; Chapanis et al, 1972) on rate of communication and information transfer has been reviewed extensively by Foulds (1980). This data on teams involved in problem-solving tasks using a variety of communication modes has implications for the study of interaction between augmented speakers and others. It suggests that one might look beyond the rate of communication in words per minute to the amount of time it takes to successfully communicate an idea or utterance. In the study of handwriting versus speech to problem solve, it was noted that less words were used in handwriting, but the task was solved with much less overall output than with speech. Given this slower mode, subjects modified their linguistic output by telegraphing and abbreviating while retaining the essence of the message content. In augmentative communication, modification of the wording and content of a message may be used to increase the rate of communication. A measure of the rate of information transfer and the time it takes to achieve an understanding of a proposition might be a more appropriate measure for future consideration.

Negotiation Strategies At present we know very little about the types and frequencies of various styles of negotiating meaning between an augmented speaker and a variety of partners. We also have little information about the efficiency and success with which partners actualize a message and the impact of different augmentative communication systems on that process.

Several of the strategies used by able-bodied speakers to facilitate the formulation of the augmented speaker's utterance have been observed (Bailey and Shane, UP-1983; Shane and Cohen, 1982; Shane, 1983; Huschle and Staudenbaur, UP-1983; Blau, 1983; Wexler et al, UP-1983; Harris, 1978). These include the use of prediction to complete a word, phrase or sentence in the process of being produced by the aided speaker and making guesses from unintelligible efforts or minimal semantic information (e.g., one symbol). Partners have also been observed to frequently check the particular language elements indicated by asking for confirmation, summarizing the elements in a proposition at different points in the utterance development and seeking elaboration or more information through a series of yes/no, "Wh" or forced choice questions. Colquhoun (UP-1982) and Harris (1978) have noted the use of "sub-questioning" or "communication fill" by able-bodied partners. In these instances, the partner asks a question and then proceeds to narrow the possibilities through further questioning before the augmented speaker has an opportunity to respond (e.g., What did you do on the weekend? Did you visit your friends? Did you go to the football game? Did you watch t.v.? - Colquhoun, UP-1982).

The frequency with which listeners predict and elaborate, the length of this process and the success are not well known. Bailey and Shane (UP-1983), in their study of a 13 year old boy's interactions with his mother and school aide, noted that the mother rarely attempted to predict, and when she did, her son infrequently acknowledged these predictions. In contrast, prediction and expansion was successfully used by the school aide with the same child. Huschle and Staudenbaur (UP-1983) in studying the communicative breakdowns of an adult word board user with a familiar and unfamiliar partner, made several observations of the guessing behavior used by the partners. Of the 28 guesses made by the familiar listener, 16 (57%) were appropriate. In contrast, the unfamiliar partner guessed less frequently. Of the 12 guesses, 3 (25%) were appropriate. In the study of Wexler et al (UP-1983), the number of guesses was significantly greater in the unaided condition. In the no-board condition, 92 partner guesses were recorded; only 3 guesses were recorded during alphabet board use. Predictions and guesses may also be interruptions in a communication effort when the aided speaker has not relinquished his or her turn to the partner (Harris, 1978; Colquhoun, UP-1982; Buzolich, UP-1984; Beukelman and Yorkston, 1980).

The augmented speaker also uses a variety of communicative strategies to produce an utterance quickly and effectively (Shane, 1983; Calculator and Luchko, 1983; Harris, 1978, 1982; Yoder and Kraat, 1983; Colquhoun, UP-1982; Bailey and Shane, UP-1983; Beukelman and Yorkston, 1980). The aided speaker may use a telegraphic or shortened style and rely on the partner to expand it to a full utterance. Aided speakers (both spellers and non-spellers; advanced system and board-users) have also been observed to frequently use multiple modes of communication for efficiency or an intermediary who understands them when they communicate to a less familiar person or participate in a group. Likewise, communication partners have been observed to direct their questions to an intermediary person, or turn to them to assist in understanding and expanding communication efforts. A few researchers have noted that some augmentative speakers do not use the resources they have available to communicate an utterance completely and clearly even when this is appropriate to the situation. In these interactions, the aided speakers place the burden on the partner to guess and elaborate when they could have efficiently used available linguistic context (Harris, 1978; Kraat, UP-1979; Colquhoun, UP-1982).

At first glance, the development of an utterance and its content may look quite similiar to the communication between parents and children at the pre-linguistic level or at developmental levels at the one- to three-word stages (e.g., below the age of three) (Foster, 1985). Establishing reference and propositions in augmented speakers, however, has several major differences. First, the person attempting to convey a topic or reference through non-linguistic context or non-verbal behaviors is frequently at developmental levels well beyond that of a one to two year old. What they may want to express may have little to do with the concrete "here and now". In all probability, the propositions and utterances they want to convey are much more complex and abstract than those expressed by young children through non-verbal actions and single words. For the utterances that these augmented speakers want to say there may be few tangible referents in the physical environment to cue the topic or referents. They must establish content and meaning through the clever use of the vocabulary available to them, non-verbal and verbal resources, non-linguistic context and the abilities of their partners.

## The Form and Content of Utterances

What types of utterances are contributed by augmented speakers during a conversation? What form and mode are frequently observed? How is this influenced by the communication devices and the situations involved? Do partners speak to augmented persons in the way they speak to able-bodied children and adults? Again, our observations and research findings in this area are very preliminary. Some findings and observations will be presented here with regard to vocabulary and mode use, the syntactic and semantic content of messages, and the paralinguistic devices used by augmented speakers. Some tentative observations about the alterations in the able-bodied speaker's form and content, and the shifting of message style in the speaker will also be discussed.

Form and content are integrally related to the proposition and intention that the user wishes to convey to a particular partner. For example, asking a person if they want a drink can take a variety of forms (e.g., Drink? You want some? Are you thirsty? Want something to drink? Could I offer you something to drink?). The particular wording selected is shaped by who the partner is (e.g. a stranger, authority figure), the intentions of the speaker (e.g., I don't really want to give you a drink), and the developmental level of the speaker. The form and content of an utterance is also influenced by the prior utterance or utterances in a conversation. For example, a question such as, "Where did you get these shrimp?" obligates the partner to answer the question and confines the type of response that can be made.

In looking at form and content in the interactions between augmented speakers and their partners, several other influences emerge. It may be difficult to speak with the wording that is required and desired by the augmented speaker. This may be due to the fact that the vocabulary needed is not readily available to the aided speaker, or it is more efficient to accomplish the exchange in another way (e.g., a shortened or telegraphic version, or through an expression or gesture). In other instances, the symbol system used may lend itself to semantic constructions rather than the use of traditional syntactical form (i.e., Blissymbolics). It is also probable that the slow rate of communication available and the effort required of both partners may keep an augmented speaker from producing some utterances that certainly would be used if communication was faster and easier. It is also important to remember that many communication acts and utterances of persons speaking without a communication aid or with minimal vocabularies, are actually formulated by the partner, not the user. These utterances may or may not be what the augmented speaker would have liked to say. We need to be cautious in our conclusions and not equate the utterances we observe with either the capability or social and language knowledge of the augmented person.

The Content of Propositions What types of meanings and propositions are frequently expressed by augmented speakers? As with other areas of communication study in this relatively new field, the information is sparse. Some is available with regard to users of Blissymbolics through the work of Andrews, UP-1980; Silverman et al, 1978; Harris et al, 1979; Light, 1985; and James, IP. Uldwin (IP), in her study of children's use of Blissymbolics and Makaton sign over a two year developmental period, has also included semantic/syntactic measures. Beukelman, Yorkston, Poblete and Naranjo (1984) have also provided information on vocabulary and sentence usage in persons using an alphabet printout system. These researchers have approached meaning and semantics from different points of view and coding systems. Some have looked at what vocabulary words are used in spontaneous communication from available language arrays. Others have attempted an analysis of the semantic referents and relations coded in the utterances of these children through different coding and analysis schemas.

The Blissymbols available to the children studied varied in number and content, and in how these vocabularies were selected and presented. In some situations, Blissymbolics were presented to the child in predetermined arrays (e.g., 240 display) and then the child was gradually trained to recognize these representations. In other studies, the symbols were determined and trained one at a time and then added to a display. John James (IP-1983) has examined the spontaneous utterances of ten children over a period of four years in relation to the 400 symbol displays available to them. He noted that a large number of symbols known (recognized) and available to these children were not actually being used in spontaneous communication. Other words that were needed to complete a proposition (and were supplied by the listener through other means) were not available in the symbol array. Harris et al (1979) also noted discrepancies between what was available to the mentally retarded children studied and the symbols that were actually used in spontaneous conversation. This difference was greater for some of the children studied than for others. For example, child D used 80/200 symbols, child F 20/100, and child C 122/175. The frequency and types of use of particular vocabulary items were not tabulated. As a subanalysis in the study by Light (1985), a type/token analysis was performed to examine variety in the vocabulary used by the children in her interaction study. The children demonstrated diversity in the symbols used (mean type/token 0.77). However, Light observed that these children only used a small percentage of their available symbols during the play interactions examined (mean of 9% of available symbols with a range of 3-15%).

The printed utterances of five adolescent/young adults over a period of two weeks have been analyzed by Beukelman, Yorkston, Poblete and Naranjo, (1984), with reference to the vocabulary used and the variety of propositions expressed. In their analysis, a pool of 500 words represented 85% of the printed utterances made across speakers; 100 words represented 60% of that sample. The augmented speakers expressed a much greater variety in the wording of sentences and phrases used in conversations during that time period. This was observed for both intra- and inter-subject usage. The authors conclude that for the group studied (using alphabet construction) message redundancy was infrequent at the level of a proposition. To date we do not have studies of interactions in which one of the partners is using a technical aid with large sentence storage capacity. As these sentences can be rather rapidly used in conversations, it will be of interest to see if augmented speakers can, and choose to, use a large percentage of these "stock sentences", and to determine which sentences are most fruitful to include in these storages.

It is of value to know what words or symbols are used. However, vocabulary studies provide little information about the meanings that are encased in a multiword utterance. One must also recognize that these words are being viewed in isolation. The vocabulary and utterance used is influenced by many factors including efficiency, the specific words available to a user, the training that has been provided, and the demands placed on the user by previous utterances. Augmented speakers also use a high percentage of non-verbal and gestural modes in communicating. These meanings are frequently not included in such an analysis.

The utterances of Blissymbolics users studied have also been examined for the semantic reference and relations expressed. Light (1985) analyzed the data collected from her play context with mothers and non-speaking children using the coding system of Retherford, Schwartz and Chapman (1981). The semantic categories expressed varied across the children studied. However, a large proportion were concepts of object and location, followed by action, entity and agent. Andrews (UP-1980) and Silverman et al (1978) used the ELIS (McDonald and Blott, 1974) for analysis. Andrews, in studying a group of children with Blissymbolics boards in the classroom and speech treatment, also noted that object was the most frequent class used by the children. Object use was greater in the speech treatment session. In contrasting the two contexts, it was noted that imperatives, social functions, negation and agreement occurred more frequently in the classroom. The speech treatment session produced a wider variety of semantic categories and more declaratives. Silverman et al (1978), in an analysis of use over time, noted the frequent use of agent + action + object, and agent + action + location in the Bliss users studied. There was also frequent use of attribution, past indicator, time reference and prepositions in the Bliss constructions.

Information regarding the propositions and propositional content of augmented speakers has received minimal attention and our observations are sparse. However, many feel that one of the major impacts of augmentative communication systems is in this area. That is, given linguistic avenues (e.g., symbols, letters, phonemes, phrases), severely disabled speakers can more easily and effectively express propositional content at various levels of complexity. Given an aid and training, an augmented speaker may begin to contribute utterances such as "Now look here, why can't I make a telephone call!" or "That laugh of his gets right up my nose!" (James, 1982). An adult can ask a complicated question about his income taxes through a spelling system instead of inefficiently and ineffectively trying to establish this meaning through a "20 questions" guessing routine. A framework is needed to capture these gradations and the levels of social and communicative interaction that emerge from the use of communication technology. We need to understand the impact of various device characteristics, symbol systems, vocabulary sets and training paradigms on those interactions.

The Syntactical Form In examining communication samples, one sees complete and lengthy sentences or multi-sentences communicated by persons having access to devices with paper printers, pre-stored sentences or persons having phoneme or spelling skills and a comparatively fast rate of production. For example, in the study by Beukelman and Yorkston (1980) the average number of words per communication "event" in using the printed mode was 27.8. In the alphabet board condition, each event averaged 5.5 words. More complex and lengthy utterances have also been documented in conversational exchanges in which listeners are less controlling and provide the aided speaker with undivided time and attention (Personal communication - John James). Complexity and length have also been observed in situations where a partner chooses to say an utterance in a particular way regardless of efficiency and its effect on the listener (Personal communication - H. Shane, K. Yorkston, D. Oken, I. Fishman). It is interesting to note that in the study done by Farrier et al (IP), able-bodied persons attempting to solve problems collectively used a large number of words to accomplish the task when using speech. When one partner was asked to solve these problems through the use of an alphabet printout system, there was a dramatic reduction in the number of words used by this partner.

It is also observed that augmented speakers may frequently communicate through use of single words, fragments or telegraphic utterances (Harris, 1978; Colquhoun, UP-1982; Yoder and Kraat, 1983; Light, 1985; Silverman, Kates and McNaughton, 1978; Morningstar, UP-1981; Culp, UP-1982). Culp (UP-1982), in her study of children and mothers, reports a mean length of utterance of 1.6 words (range 1.2 - 3.0) for the children using augmentative aids. Light (1985) and Harris (1978) in their study of pre-spelling children with teachers or caregivers also report a predominance of single word utterances on the part of the children. These researchers note that these single word utterances were either appropriate (e.g., the result of specific questions asked by the partners) or communication efforts by the children that needed to be expanded by the teachers or parents. The studies of Silverman et al (1978) and Harris et al (1979), although not interaction studies per se, reported typical spontaneous utterances of between 2 and 5 words in length for the groups they studied.

In the studies of Colquhoun (UP-1982) and Morningstar (UP-1981) with older adolescent and young adult Blissymbolic's users, a high percentage of sentence fragments and telegraphic utterances were observed on the part of the augmented speakers. These studies suggest that some of these behaviors are efficiency efforts by the augmented speakers; others are based in the nature of Blissymbolics. For example, the utterance, "Last night I watched tv and saw a show about Dracula", might be communicated through the following symbol combination: night + watch + t.v. + show + D (Silverman et al, 1978). The Blisssymbolics users studied by Morningstar tended to use more telegraphic forms and unique strategies with the familiar partners. They included more function words and syntactical elaboration in communication with the persons unfamiliar with the system.

During the course of the IPCAS study, several opinions and observations have been shared with regard to linguistic form. Participants have reported that some developmentally disabled individuals demonstrate syntactical problems when they begin to use independent communication devices. Or, they have a reduced number of forms which they use repeatedly. They suggest that this might be due to lack of experience, some training, or the fact that partners have been doing much of the elaboration and actualization of utterances for the aided speaker (Personal communication - S. Dashiell; M. Fried-Oken; E. Kravitz; C. Goosens, H. Shane). There are also different schools of thought with regard to the expression of form. Some parents and professionals feel strongly that complete syntactical form should be used at all times regardless of the slow rate of communication that can be effected. Others feel that efficient and effective communication should be primary and that full syntax should be known, but need not always be used. The developmental and interaction impacts of these positions remains to be studied.

Paralinguistic Aspects Natural speakers use a variety of paralinguistic devices along with form and content to express meanings and intentions, some obvious and some subtle. For example, a sentence such as, "He never went there", can be conveyed in a definite or hesitant manner, or infer differently about "he" or "there" by stress, pausing and intonation patterns. Meanings can further be marked by facial expression, body posture and non-verbal gestures. These semantic differences may or may not be possible for a person with severely-impaired speech (Higginbotham and Yoder, 1982). Most synthetic speech devices currently available provide minimal control over pitch contours, pause time and stress/duration of a word within a sentence pattern. Printed modes and language boards cannot convey traditional prosodic features.

As with many other areas, paralinguistic aspects have received little research or observational study in the augmented speaker. In the study of Beuttemeirer (UP-1983) and Higginbotham and Yoder (1981), the augmented speakers had some residual speech skills. These adolescents and young adult speakers were observed relative to their use of traditional paralinguistic features. In the two subjects studied by Higginbotham and Yoder, both were able to use prosody for a rising and falling inflection pattern, for feedback and to convey an affective state. Two of the five subjects studied by Beuttemeirer were observed to use linguistic stress, and four out of the five subjects used intensity to regulate or gain attention.

Several observations have been made about ways in which augmented speakers attempt to accomplish some of these meanings in augmentative modes (Personal communication - M. Cappozzi, D. Yoder, A. Newell, A. Cook, M. Sitver-Kogut, G. Anden, F. Carlson, M. Lundman; Higginbotham and Yoder, 1982). In a printed message, stress may be noted by capitalizing, underlining or using exclamation points. Other speakers have been observed to create emphasis by circling a word repeatedly with a light beam, repeatedly indicating a symbol or altering the force with which an item is pointed to. Meanings which might have been conveyed through paralinguistic means are often directly expressed. For example, the message "He never went there" might be expressed as, "George does not do things like go to the Nugget!" Words might be included in the message that indicate how it should be interpreted (e.g., joke, ha ha, just kidding). Other users have reportedly used differential use of an auditory attention- getting device, or non-verbal facial or body gestures to accomplish particular meanings. It has also been observed that because they lack traditional paralinguistic and non-verbal behaviors, augmented speakers may inadvertently convey meanings that are not intended.

The Use of Multiple Modes In reviewing the data on mode use, some general patterns and impressions appear. First, augmentative communicators are highly multi-modal. That is, they use a variety of modes in communication. Message-bearing elements and whole propositions are conveyed through residual speech, non-verbal behaviors (e.g., eye-pointing or looking, facial expressions, head and arm gestures, body gestures), and aided linguistic systems. This has been observed both for non-spellers with limited vocabularies and persons with spelling and/or advanced technical aids (Wilson, 1982; Andrews, UP-1980; Bailey and Shane, UP-1982; Blackstone and Cassatt, IP; Beuttemeirer, UP-1983; Calculator and Dolloghan, 1982; Colquhoun, UP-1982; Light, 1985; Light, Parnes and Colliers, 1984; Kraat, UP-1979; Sponseller and Laikko, UP-1982; Culp, UP-1982; Morningstar, UP-1981; Calculator and Luchko, 1983; Beukelman and Yorkston, 1980; MacDonald, 1984). Several children and adults use more than one communication device and/or have multiple output modes available to them within a single device. An augmented speaker shifts among these devices or modes (e.g., speech, visual display, device turned off) as different communication situations arise (Beukelman, Yorkston and Dowden, 1985; Mills and Higgins, 1984; Bottorf and DePape, 1982; Beukelman et al, 1981; Goosens and Kraat, 1985; Fishman and Kerman-Lerner, UP-1983; Personal communication - D. Yoder, A. Cook, R. Creech, N. Marriner).

Several researchers have also reported that persons using augmentative communication devices use these devices less frequently than other modes. This predominance of non-device use has been observed across augmented speakers, partners and various contexts. Minimal aid use was observed by Harris (1978) in her study of three children in the classroom; Calculator and Dolloghan (1982) in their classroom study of mentally retarded subjects; Calculator and Luchko (1983) in their observations of a young adult in a nursing home; Kraat (UP-1979) during observations of an adult Canon user in an institutional environment; Beukelman and Yorkston (1980) in a study of an adult in a home environment; and Beuttemeirer (UP-1983) in her study of five mentally retarded residents in the residential and school environment. These subjects were found to primarily use non-verbal modes to convey meanings. Studies of augmented speakers in structured research contexts (e.g. forced communication; performing specific communication tasks) have also observed a high percentage of non-board modes in those interactions (Bailey and Shane, UP-1983; Colquhoun, UP-1982; Light, 1985; Light, Parnes and Colliers, 1984; Sponseller and Laikko, UP-1983; Culp, UP-1982). It should be noted that the subjects studied in these elicited contexts had minimal spelling skills and were communicating with familiar caregivers or teachers, with the exception of one unfamiliar partner included in the Sponseller and Laikko study.

Others studies of interactions have observed a high and frequent use of a communication device by an augmented speaker. Wilson (1982) presents data on four children observed in the home prior to beginning a Morse Code communication project. Two of these children used an augmentative aid as their primary mode of communication (S2 - 61% eyecode, 31% gestural, 7% verbal; S4 - 59% communication board, 39% gestural, 1% verbal). Andrews (UP-1980) found communication device use to be predominant in the speech treatment session for six children. In contrast, these same children used non-board modes with greater frequency in the classroom observation. Beukelman and Yorkston (1980) noted the modes used by one adult in communicating with the clinician, spouse and two attendants. The electronic device was the primary mode used with one of these partners; speech was primary for the other three partners.

Blackstone and Cassatt (IP) observed the frequency of aid use to vary by context and user. In their study of children and mothers, device use ranged from 0 to 80%, with one child never utilizing the device mode. These researchers also observed that for some children, the amount of board use fluctuated across activities. For example, in one mother-child dyad, the child used the aid 9% in the snack activity and 39% in the picnic activity. Culp (1982), in her study of child-mother interaction, also observed that the percentage of board use fluctuated between dyads. In her observations, children's board use ranged from 10.1% to 73.2% across dyads. A similar finding was reported by Light (1985). In her subjects, non-board modes accounted for a mean of 81.8% of their utterances (range 66 to 100%). One child was never observed to use his board in interaction with his mother.

Users of multiple aids and technical aids with various output options have received minimal attention in studies to date. It would be of interest to know which output modes are used under what conversational situations, and whether or not the various rate enhancement features placed in technical aids are actually being used and to what effect. Beukelman, Yorkston and Dowden (1985) present a description of one adult who communicated to his wife through dysarthric speech and used a letterboard as a backup for communication breakdowns with her. He used the letterboard as a primary mode with others, and shifted to a small portable writing aid for longer messages and written material. The work of Fishman and Kerman-Lerner (UP-1983) suggests that portable, non-electronic devices were used more frequently in direct interactions with familiar persons than a non-portable printout device. Harris (1978) observed that the young children in her study often selected a less effective mode from the device alternatives available. These children tended not to use the visual display as a means of interacting in a group situation, but used this mode in a one-to-one interaction.

In discussions with aid users and others during the course of this study, it appeared that many persons with multiple mode systems are choosing to use a non-electronic system (if this is a rather rapid, direct selection technique) for interpersonal intimacy; speech output modes for distance and social conversation; and a print mode for lengthy communication or to assist a new listener (Personal communication - Ricky Creech, Ulla Ungermann, Evacarin Holmquist, Donna DePape, David Yoder, Michael Reese).

Several researchers have noted that requests are often made for the augmented speaker to use an obligatory mode in their interactions (Light, 1985; Harris, 1978; Andrews, 1980; Calculator and Dolloghan, 1982; Colquhoun, UP-1982). This is generally to request to use the communication device or board. Harris (1978) presents a classic example:

Teacher: "What do you want?"
Aided Child: (Points to the ball)
Teacher: "No, tell me with your board."
Aided Child: (Points to the ball again)
Teacher: "How can you tell me with your board?"
Aided Child: (Puts head down on laptray)

Multiple modes may be combined sequentially within an augmented speaker's turn or utterance, or across utterances on the same topic. Some examples are found in the Blissymbol Project report of Silverman, Kates and McNaughton (1978). This sequential combining and integration of modes has had little attention or documentation in research to date. An exception is the study of a 12 year old boy by Alison MacDonald (UP-1983; 1984). This particular child used a sign vocabulary of over 350 signs and a Blissymbolics board with 400 symbols for communication. In her analysis, she noted that Blissymbolics and signs could be integrated within one utterance, or a shift made from one mode to another in an effort to clarify. In her analysis, Bliss was preferred for nouns and adjectives, while signing was more frequently used for verbs. The mode used was often related to the type of communication act or utterance being conveyed. MacDonald's subject predominantly used sign for social responses and requests. Blissymbolics were used more frequently for commenting or reporting.

The mode used may have an impact on the propositional level of the communication effort and the success of the attempt. Both Morningstar (UP-1982) and Calculator and Dolloghan (1982) have observed that non-verbal modes were less frequently responded to by the partners they studied than attempts made through the communication device. It is not clear whether these efforts were unrecognized or ignored. Other researchers have noted that communication devices are often spontaneously used or requested in an attempt to resolve communication breakdowns. The use of this mode correlates with the level of propositional content that the user independently communicates (Light, 1985).

In attempting to understand the interactional patterns that occur in communication between augmented speakers and others, the observations of multi-modal use and frequent under-utilization of technical aids need to be examined from several viewpoints. First, are the modes used the most appropriate for the speaker, given the situation and context, or given the characteristics of that person's augmentative device? One can observe various patterns in this respect. Person A may not have an appropriate language item in the language display to answer a specific question and may therefore attempt to answer through a gesture. Person B may have the answer in stored words in the language display and chooses to use it. Person C may have the ability to spell the answer linguistically but chooses to point to the answer for efficiency. Person D may have the ability to formulate the answer through the communication device, but chooses to use non-verbal behaviors which are ambiguous and require a series of questions from the partner. Three of these four augmented speakers used non-board modes. Only person D opted for an inappropriate mode, given the situation and communication demands. If person A and person D had different device characteristics (e.g., the words or speed), the use of the communication device might have more appropriate than non-verbal modes. These illustrations are used here to heighten awareness of the relationship between available options and the mode use of an augmented speaker. The augmented speaker may be using the fastest, most effective mode available to them or, as Harris (1978) and Kraat (UP-1979) observed in their subjects, an inappropriate or ineffective mode, given the repertoire available.

Second, it is of interest to look at the meaning being conveyed by the augmented speaker and how these utterances and communicative functions relate to multi-mode use. For example, a large portion of the augmented speaker's utterances may be confirmations, negations or answers to yes/no questions. These responses can quite easily and effectively be answered with vocalizations or head nods. Utterances that have a more complex propositional content often necessitate a linguistic formulation when possible (i.e., device use). The demands of the communication task may also shape the mode selected and used.

Several other reasons have been suggested for the underutilization of communication devices in some users. These include: 1) use of other modes to circumvent the severely reduced rate of communication; 2) lack of continual availability of devices (Beuttemeirer, UP-1983; Andrews, UP-1980; Harris, 1978; Barker and Henderson, IP; Kiernan, Reid and Jones, 1982); 3) the overextension of communication patterns established in the speaker and partner prior to the introduction of a device; 4) vocabulary available within the augmentative devices (Calculator and Dolloghan, 1982); 5) nature and extent of the training that has been provided (Jolie, UP-1981; Calculator and Luchko, 1983; Goosens and Kraat, 1985); 6) particular device characteristics (e.g., the inability to communicate from a distance, Calculator and Luchko, 1983); and 7) psycho-social skills of the aided speaker, particularly in reference to assertiveness and independence.

In summary, modes other than the commmunication device are important avenues for communication in this population and should be maximized. However, the under-utilization of communication devices needs further investigation and exploration, in terms of future design, training and the ability to provide greater propositional communication and social interaction to disabled children and adults.

The Form and Content of Partner's Speech Augmented speakers and their partners are people with different perceptions, sensitivities and shared knowledge and experiences with each other. Therefore, the manner and style in which able-bodied persons interact with a person using an augmentative system also differs. Some partners may retain patterns very similar to those used with other familiar, able-bodied adults and children. It is often observed, however, that the speaking style of partners is altered when confronted with this difference in communication modes and abilities.

The form and content of the partners' utterances have been observed to change in a variety of ways (Holmquist, 1984; Creech, 1982; Vigianno, 1982; Blau, 1983a; Shane and Cohen, 1982; Rush, 1983). Persons highly familiar with an augmented speaker may use an intonation pattern similiar to that used with persons younger than the aid user or may alter the content and form of utterances. This alteration might be a shift to using a large percentage of yes/no and "Wh" questions, speaking in a manner that does not invite or expect participation from the partner, or talking about topics and content in a reduced manner. Persons less familiar with augmented speakers or strangers to them, frequently have been observed to alter language use extensively, and speak in a pattern similar to that used when speaking to very young children, foreigners or cognitively-limited persons (Van Kleeck and Carpenter, 1980; Ferguson, 1975; Slobin, 1975). Utterances may be slower, higher pitched, shortened, telegraphic and/or louder. The utterances may also be more concrete than those used during communication with other adults and children.

Several reasons have been suggested as to why partners may alter their speaking style with non-speakers. These include viewing the augmented speaker as a devalued or less capable communication partner. In addition, since traditional signals are missing or altered, there may be difficulty on the part of the able-bodied person in establishing the comprehension and expression level of the augmented speaker. Partners may also resort to questioning to control the topic, content and interaction successfully, and/or take social control through questioning to cope with the difference (Corsaro, 1979; Mishler, 1975; Blau, 1983a; Rush, 1984).

Although observations have been made, formal studies have infrequently focused on the form and content used by the able-bodied partner in interactions. Culp (UP-1982) reported that the mothers in her study used a mean length of utterance of 6.8 words (range 5.5. - 8.4) in speaking with their children (5-13 years in age). These mothers were also observed to use the communication aid in a modeling manner in their speech a total of nine times. To date, there has been little attention to the interactions between siblings and children when one child is a non-speaker.

## Communicative Functions, Purposes and Intentions

In the study of interaction betweeen augmented and natural speakers, several researchers have examined the communicative acts or functions expressed by the aided speaker and partner using a variety of taxonomies and models. These studies have primarily looked at intention from a language or speech act perspective, e.g., a particular utterance was spoken to acknowledge, describe or request yes/no information. The questions being asked by researchers are: 1) What types of acts or functions occur in the utterances of both partners, and with what frequency; 2) Is there a variety in the acts and complexity expressed; and 3) What is the influence of device characteristics, the partner's behavior and the context on what is observed?

It is extremely difficult to integrate research findings in the area of intention and to make meaningful conclusions from this work. First, each researcher has used a different taxonomy and series of definitions for coding an utterance act. For example, the studies of Colquhoun (UP-1982), Andrews (UP-1980) and Culp (UP-1982) coded five to six functions only in their studies, and these were based on different taxonomies. Wexler et al (UP-1983) used five general act classes (requests, responses, acknowledgments, statements and organizational devices) and subdivided these classes into 28 communicative acts for analysis. Turn and utterance segmentation for coding these intentions are also not universal across research studies. In addition, some researchers have analyzed the repetitions and acknowledgments that are a part of the technical development of an utterance and included them with the analysis of communicative acts. Others have tabulated technical and communicative utterances separately, giving different results. It is also recognized that decisions about the purpose or intention of a communicative act are highly subjective and reliability is questionable when coded only by one observer. Difficulties are also compounded when multiple modes are used or a single word is produced by an aid user. In these cases, intentions are inferred rather than superimposed on a full linguistic utterance. The question also arises as to how to apply conventional schemas to the unique forms of communication involved, such as when the partner is an active part of the actualization of a proposition or meaning. For example, in a sub-questioning sequence in which the partner asks a question such as, "Where do you want me to put your radio?" and then proceeds to answer this through a series of yes/no questions (e.g., In the drawer? In your bag? By the bed?) is the aided speaker or partner recognized for the use of propositions? These research difficulties are very real. However, the study of communicative acts from a purpose and intention perspective is important and the obstacles are not insurmountable.

Studies to date have observed that a high percentage of the augmented speaker's contributions are answers to yes/no questions, forced choice questions, "Wh" questions and acknowledgements or confirmations (Blackstone and Cassett, IP; Colquhoun, UP-1982; Culp, UP-1982; Calculator and Luchko, 1983; Wieder and Kornet, UP-1983; Light, 1985; Light, Collier and Parnes, 1984; Harris, 1978; Lewis and Ripick, UP-1983; Sponseller and Laikko, UP-1983; Lossing, UP-1981; Wexler et al, UP-1983). These findings are found in the studies of interaction involving augmented speakers with and without spelling capabilities. Natural speakers have also been observed to be asking a large percentage of specific yes/no questions, forced choice questions and "Wh" questions of the augmented speakers. This question-response pattern appears in both structured observations with teachers and caregivers, and in observations made to date in the natural environment (Lossing, UP-1981; Kraat, UP-1979; Beukelman and Yorkston, 1980; Harris, 1978, Calculator and Luchko, 1983). The percentages of these simple and required responses in relation to the total number of utterances fluctuated across dyads studied.

Obviously other types of communicative acts and functions do occur in the interactions between augmented speakers and others. Researchers have documented question-asking, statements, greetings, commenting and requesting on the part of the aided speaker. They often show large numbers in categories of functions labeled "other" or uncodable (e.g., Colquhoun, UP-1982; Lossing, UP-1981; Culp, UP-1982; Wexler et al, UP-1983). It has also been observed that all partners do not necessarily use question-asking with high frequency. Partners have been observed to frequently comment on the aided speaker's utterances (Weider and Kornet, UP-1983) and respond to questions and requests from the aided speaker (Beukelman and Yorkston, 1980; Wexler et al, UP-1983). Participants in this project often shared videotapes, observations and language samples in which augmented speakers showed a wide variety of utterances and intentions. For example, teasing was exemplified through comments such as, "You are a mean and cruel teacher," or "I'll dot your eyes out!" Being socially graceful was indicated by asking, "If you like violets, please take some home with you," and expressing the self by saying, "You have not noticed my hair", or indicating that you are being ignored by saying sarcastically, "I suppose Betsy Ross has time for everyone else." (J. James, E. Davies, J. Vincenti, D. Rutrick, A. Easton, D. Yoder, S. Stuart, J. Eulenberg, M. Sitver-Kogut). Again, the question is raised about the varied continuum of aided speakers and partners. There is a need to understand whether or not the impressions projected by research studies represent the majority of this variation. We also need to determine whether the measures currently being used are appropriate for gaining this type of information.

In the communication environments and samples studied, the aided speaker has often used a reduced variety of types of communicative functions (Harris, 1978; Culp, UP-1982; Blackstone and Cassatt, IP). Several contributing factors have been discussed and explored. Light (1985) has suggested that the communicative functions observed are tightly interwoven with the discourse status and demands on the augmented partner. In other words, able-bodied partners often take the lead and control in the interaction, initiate topics and pose questions that obligate the partner to respond with an answer. These answers are frequently yes/no and single word responses. The children in the study were infrequently asked to participate in other ways. This impression appears to be shared by other researchers (Wexler et al, UP-1982; Blackstone and Cassatt, UP-1983).

Three research studies have attempted to gain insight into whether the paucity of communication act types observed is due to the fact that these augmented communicators do not know how to convey these intentions, or do not use them in typical interactions. Special elicitation contexts were developed by Blackstone and Cassatt (IP) and Light (1985) to examine children's ability to produce a variety of simple communicative acts (e.g., social greetings, statements, requests). In both studies, children were able to produce a greater variety of communicative functions than demonstrated in the interactions studied. In Blackstone and Cassatt's study, all of the 15 children were able to convey all of the communicative functions outlined. The children studied by Light did not demonstrate the ability to produce all of the communication functions under study in their elicitation context. In this study, there was individual variation among the children studied. Most of the children did not request information or clarification within the eliciting context.

In a recent study by Sutton (UP-1984), four young adults with receptive language scores between 8 and 11 years of age were given the Let's Talk Inventory (Wiig, 1982). This test examines 40 speech acts representing four general classes of communicative functions (e.g., ritualizing, controlling, informing, feeling). These Blissymbolics users demonstrated the ability to express a variety of speech acts in this elicitation task. As a group, the subjects were most successful in the informing function, followed by ritualizing and controlling. The feeling category appeared to be the most difficult. Most of the Blissymbolic communicators obtained overall scores in each function and context equivalent to the 13-14 year old able-bodied group for at least some some of the speech acts/group. These users used syntactical structures and devices which were used by the control group, as well as unique forms to accomplish these acts. Of particular difficulty were those acts that required complex syntactic and/or conceptual structure (e.g., promising, negotiating), or those that required a specific formula (e.g., introducing someone). All subjects demonstrated the ability to shift styles (register) when in the peer or authority situation. For example, the sentence, "Future + you + say + it + again + please", was used for the peer context, and the sentence, " I + sorry + not + to hear you + please + to say again", was used for the adult context. Sutton concluded that these augmented speakers were more competent in their social knowledge than was expected from prior interaction samples. These studies on developmentally disabled children and young adults suggest that communication training needs to address both the development of communicative intentions of various types and complexity and how these can be actualized in everyday conversations.

The works of Wexler, Blau, Leslie and Dore (UP-1983), Beukelman and Yorkston (1980), Sutton (UP-1984), Calculator and Luchko (1983), Calculator and Dolloghan (1982), Yoder and Kraat (1983), Light (1985) and Harris (1982) suggest that device characteristics may be related to the types of communicative acts observed. Beukelman and Yorkston's study compared an aided speaker's communication in the home when he used an alphabet board to when he used a typewriter. Results indicated that the mode used influenced the types of functions that occurred. The aided speaker requested and provided more information when using the typewriter than when communicating through the alphabet board. In contrast, he requested assistance and asked more "Wh" questions when he was using the alphabet board. In the Wexler et al study, the interactions of adolescents and young adults and their partners were compared in two conditions: with the augmented speakers using an alphabet board and with the board removed. Several differences were noted in both the aided and natural speakers' use of communicative acts in these two situations. The aided condition increased the number of process (open-ended) and product (Wh) responses observed in the augmented speakers. It also reduced the overall number of yes/no and forced choice questions used by the natural speakers. A greater variety of types of statements (description, identification, procedural, evaluation, internals and explanation) and complex C acts were also produced by the device users in the aided as opposed to the unaided interaction. Light compared two subgroups of children; those using a direct selection technique and those using a variety of indirect techniques (e.g., Etran). She observed a greater frequency of yes/no responses and affirmations in the group using the the indirect techniques. However, the subject number was small and further study of differential patterns across techniques is needed before definitive statements can be made.

The vocabulary available to the aided speaker has been raised as a possible source or at least a partial source of the observed reduction in communicative acts and subtypes (Calculator and Dolloghan, 1982; Yoder and Kraat, 1983; Sutton, UP-1984; Personal communication - G. Vanderheiden, S. Calculator, P. Wassan). The aided speaker may not have the vocabulary available to express a wide variety of functions (e.g., social greeting, comments, the ability to ask questions), or functions that need extensive language for expression. The slow rate of communication possible to the aided partner is also considered a contributing factor (Yoder and Kraat, 1983; Shane et al, 1982; Harris, 1982). Some types of communicative acts take much longer than others to formulate, or are impossible to accomplish with the given contraints (e.g. time-related comments). A slow rate may make it more efficient to let the partner take the lead in topic, or to construct a conversational act through a question-answer sequence. It may also be the case that the slow rate makes it very difficult for the augmented speaker to escape from a barrage of questions and partner control in order to initiate communication intentions (Light, 1985; Lossing, UP-1981). Proxemics may also play a role since communication from a distance may be more effectively framed in a yes/no sequence, versus the partner coming close to the aided speaker for linguistic participation (Calculator and Luchko, 1983).

Discussions with professionals outside of the United States have heightened this researcher's awareness of the importance of the social and psycho-social aspects of interactions (Personal communication - A. Newell, G. Preisler, A. Warrick, M. Lundman, U. Ungermann, K. Galyas, J. James, J. Ehrenborg, A. Engstrom). Many of the formal research studies on interaction patterns have emanated from the United States and frequently reflect that country's contemporary research methodology in language interaction and language disorders. That perspective has often been a pragmatic one based in speech act theory. The analyses performed have been based more in the semantic-syntactic and discourse aspects of language than the social ones. Alan Newell raised an important question early in this study that has reappeared in many of the discussions that followed. The question had to do with the purposes augmented speakers might want to accomplish through communication and interactions. So often we have assumed that this is the transfer of information of a propositional nature. Newell suggests that social purposes may be equally important, if not more important, in this type of interaction (e.g., the expression of personality; gaining the feeling of belonging).

An utterance may have a single purpose, or several integrated or parallel purposes. For example, a comment such as "right" may serve as an affirmation or agreement, but may also serve social and discourse functions such as fulfilling a social obligation to participate in a group discussion, or bringing a sense of belonging to the speaker (e.g., being apart of, and accepted by, the group). An utterance that provides a description or statement may also be worded in a lengthy manner to keep discourse space and control, impress the partner with the intellectual abilities of the speaker or to annoy someone. We always need to be reminded of Bill Rush's words: "People with disabilities are merely people who need to feel loved, needed and accepted... not because some law mandates it, but because the hearts of others are able to see beyond the disability." (Rush, 1984, p. 39)

Many feel that we need to broaden our field beyond the linguistic aspects of social interaction to other areas of socialization and normalization. The area of intentions may serve as a good starting point for that exploration, for it is the study of why one chooses to speak, how one communicates to achieve those purposes, and the impact that is made on the other person or persons sharing the experience.

## Communicating Within a Conversational Structure

Much of the discussion of interaction and meaning up to this point has been focused at the utterance level. Conversation, or discourse, occurs across several utterances in a fluid interaction of ideas, participation, establishment of self, and influencing of thoughts and actions. Of interest in this report is what is currently known about the interactions that occur between augmented and natural speakers across multi-utterance sequences of conversation.

Conversation between two or more able-bodied persons has a particular organization and structure which allows these persons to interact in a conventional and orderly manner. The conventions or rules for creating, maintaining and terminating a conversation in any culture or subculture need to be understood by both partners. These include rules for turn-taking, interrupting, extending a topic, introducing a topic, holding and controlling conversational space, etc. These discourse rules can vary across contexts and partners. For example, one does not initiate a group conversation about rugby in the middle of a classroom math lesson, or necessarily interrupt a member of the clergy in the same way as one might interrupt a close friend. Conversational and social conventions not only dictate how and when two people in conversation might do or not do something, they also impact on what is said and how it is conveyed. Several of these conversational dimensions were discussed in Chapter II of this report.

In examining interactions between augmented communicators and others, one wants to know how the conversational structure and flow of ideas is carried out when one partner is using a synthetic speech device, symbol board or row-column scanning chart. Does this communication interaction look quite similar to conversation as able-bodied people know it, or are there differences? If there are differences, what are they? Are they the same across dyads? Can the augmented speaker meet the demands of some social and communicative exchanges better than others?

An Overview To date, an understanding of conversational discourse between natural speakers is incomplete and not well understood. This makes it especially difficult to carefully compare augmentative communication interaction with a normal model. However, given the areas studied in both types of interaction, some preliminary impressions can be described. Augmented speakers and others certainly interact and converse. Several aspects of those interactions are globally similar to natural speech interaction, (e.g., partners exchange "speaking" turns, topics are introduced and elaborated, conversations have opening and closing procedures, etc.) However, several characteristics of that conversational process appear to be quite different. For example, the way in which turns are exchanged, the symmetrical balance between participants and the temporal characteristics of those conversations. Conversational devices and structure also appear to differ between the dyads studied.

Persons used to participating in and studying natural speech interactions may question whether the interactions between augmented persons and others can even be called conversational (Personal communication - D. Yoder, G. Vanderheiden). In the interactions that are observed, there is communication. However, these exchanges may lack symmetry (e.g., the augmented speaker may have very little to contribute beyond affirmation and occasional single-word entries). In addition, the rate of exchange may be so slow that the fluid character of a conversation is lost. In some instances, augmented speakers and partners appear to be having a conversation. In other instances, the conversational character is lost but communication is exchanged. This observation warrants further investigation.

In general, studies to date have produced a picture of conversational exchange in which the able-bodied speaker often takes primary control of the interaction by initiating the sequence, controlling the topic or topics, dictating the type and extent of the augmented speaker's participation, doing most of the talking, and ending the sequence. These studies have also found the able-bodied partner to be the primary initiator, and the augmented person to be the primary responder. Observations have also been made of a lack of responsiveness of some partners to turns or sequence initiations on the part of the augmented person. The opposite has also been observed. Augmentative partners may not respond, or may not respond quickly enough, to opportunities (obligatory or non-obligatory) provided by the natural speakers. (Harris, 1978, 1982; Calculator and Dolloghan, 1982; Blackstone and Cassatt, IP; Culp, UP-1982; Kraat, UP-1979; Colquhoun, UP-1982; Light, 1985; Buzolich, UP-1982). Many of the findings to date have come from research contexts in which the augmented speaker and a partner have been asked to have a conversation, or talk, under observation. The portrait of the augmented person as a conversationalist may or may not be different in other environments and with different communication agendas. For example, social chatter with friends, where the urgency is greater (e.g., a request), or where needed information lies with the able-bodied partner. Farrier et al (IP) and Yorkston et al, (IP) have begun initial studies with respect to the influence of the communication task on discourse patterns.

Conversations may also look quite dissimilar from natural speech exchanges due to the large technical component in some of these interactions. That is, a large percentage of the exchange and exchange time may have to do with the actualization of an utterance with the partner repeating items indicated, verifying, guessing and expanding on the proposition being produced by the aided speaker. Conversational structure is also altered when rhetorical questions are used by the able-bodied speaker. Particularly with limited vocabulary users these interactions can go quickly from one topic to another in "routines". The questions are made to fit the vocabulary available (e.g., What's your name? Where's Daddy today? Where did you go on Saturday?). At times, these routines and question asking may be used by the able-bodied person to create a communication partner and conversational structure.

Some initial information has been collected on speaker-listener roles, length of exchanges and discourse problems. Less is known about topic development, communication effectiveness regardless of the style and characteristics, and specific strategies that are used to achieve discourse functions (e.g., holding place, interrupting, recovering from interuptions, opening up a conversation with a stranger, bids that make the able-bodied speaker relinquish control, etc.).

Signaling a Turn     Natural speakers use a variety of verbal and non-verbal signals to maintain a speaking turn or to relinquish this turn to another person. The "listener" also uses devices to signal that he or she wants a turn from the "speaker", or directly takes one by interrupting. Some of these rules and devices have been specified for face-to-face interactions and telephone conversations (Duncan and Fiske, 1977; Sachs, Schegloff and Jefferson, 1974; Craig and Gallagher, 1982; Argyle et al, 1973; Nickerson, 1977).

Buzolich (UP-1983,1982) and Higgenbotham (1982) have both examined the turn taking structure in adult-adult dyads in which one partner is using a direct selection language board or device. Buzolich used a modified version of the turn-taking system outlined by Duncan and Fisk (1977) to examine the process between an able-bodied adult and augmented speaker who were unfamiliar to each other. During part of that conversation, the augmented speaker used an alphabet board. In the remaining portion, a HandiVoice 120 device (three number coded input, synthetic speech output) was used. Higgenbotham studied a short segment of interaction between an adult using a language board and his therapist. In both studies, the interactants appeared to have a systematic and orderly set of behaviors that signaled turn relinquishing and turn taking. These differed from signals used in natural face-to-face interactions in several ways. For aid users, certain aspects of hand posture and movement were used to signal points of turn exchange and to hold a speaking turn. For example, a turn was claimed when the aid user began to encode a word manually, and this intention was signaled by a movement and hand posture indicating that a turn was about to be taken. In Buzolich's study (UP-1982), the augmented speaker was also observed to relax the hand position as one of the signals to yield a turn, or to use an encoding hand posture when there was a pause and the turn was not yet completed. Both researchers also noted differences in the use of eye gaze behavior in turn taking within augmentative-natural speaker interactions. Rather than looking at the partner, as is often done in traditional face-to-face exchanges when speaking, the able-bodied speaker looked at the communication device or board when expecting or relinquishing a turn.

To date, turn-taking signals have not been studied with persons using other types of augmentative devices or having different non-verbal skills. Observations of how this is done in other dyads include cueing the taking of a turn by the clicking of a switch or auditory signal in a device, vocalizing and/or looking toward a communication chart or portion of it, or eye-pointing toward something in the immediate environment. In some instances, attention-getting devices may be used to signal the intention to take a turn. More controlled studies are needed to afford a better understanding of the various types of speaker-listener turn exchanges that are used across communicators. Of particular interest are how augmented speakers signal and get a turn when it is not obligatory versus those situations in which it is obligatory; how persons using augmentative systems can make listener bids in order to get a turn from the natural speaker; and the verbal and non-verbal devices that might be used to directly interrupt an able-bodied speaker, or recover from an interruption.

Timing in Turn Taking The temporal aspects of turn exchange that are used for natural speakers may not be possible for persons with reduced communication rates and movements. Within each culture and subculture there is a mutually understood pause time within a turn or at the close of a turn that signals that the speaker-listener roles can change. The person who has been the "listener" can decide to enter as the next speaker or continue as the listener if a response is not mandatory (e.g., when asked a question). If the "speaker" has asked a direct question or obliged the partner in another way, the "listener" is expected to respond. This pause time varies across cultures. It is minimal in parts of the United States and extensive in parts of Lapland (Personal communication - A. Engstrom, C. Johnson). Pause time for switching turns among speaking children is typically less than one second (Garvey and Berninger, 1981; reported by Light, 1985).

When people are using different systems for pausing between turns, communication difficulties can ensue. This is illustrated in the study of cross-ethnic communication between the Athabaskan-English businessmen done by Scollen and Scollon (1980). Although both groups were English speakers, those with an ethnic background in Athabaskan languages were observed to have a different pause time in their conversational patterns. The researchers hypothesize that although this time difference is only about 1/2 second, it has a large impact on speaker-listener roles and perceptions. The English person as a speaker utilizes a pause time of one second or less. If there is no response or turn bid in that time, the speaker feels free to go on. The Athabaskan who is waiting for a signal of a longer duration, does not get an opportunity to join as a speaker. This also happens when the Athabaskan is in the speaker role. Pause time within an utterance (e.g., at the end of a phrase or one utterance of a multi-utterance turn) is also longer than it is for the English speaker. Consequently, what is considered a holding pattern for the Athabaskan is thought to be a turn exchange by the English partner and he interrupts and takes over as a speaker. Pause time differences may be a factor in the reduced participation of augmented speakers in conversations as well.

We know that it frequently takes the augmented person much longer to start and complete an utterance than it does for the able-bodied partner. However, we have little information with regard to the average pause time needed for augmented persons to participate easily, given a variety of devices and physical abilities. It is probable, however, that they may not be able to meet the normal time demands for claiming and taking turns. Janice Light (1985) is the first researcher to look at pause time and its effects on augmentative interactions. She tabulated the average number of seconds it took the children to respond to questions in the mother-child interactions she studied. Her purpose was to understand when an opportunity for participation had not been taken; see appendix D for definition of child and adult turn opportunity. The mean between all dyads and all modes of communication was 0.69 seconds, and clearly within a one second period. The pause time needed by these children for initiating, as opposed to responding, was much greater. Here, the mean across dyads was 1.64 seconds. These initiations, however, appeared in her data infrequently.

Light's study suggests that initiations by children using language boards are more probable when the adult stops talking, and provides the opportunity and time for the child to do so. The highest rate of interaction among the children studied occurred with one child whose mother allowed long periods of silence (i.e., up to 47 seconds in duration). This child initiated speech 45 times in a 20 minute period as opposed to a mean of 11.7 for the other children studied. Additional support for the relationship among silence, pause time and initiations in augmentative system users is found in the work of Lossing (UP-1981). When the spouse kept data during the interaction, the augmented speakers generally showed a greater rate of initiation than they did in conversations where the natural speaker was not slowed down by data collection. Studies in which the partner commented on actions or interacts in non-directed play with a child have also shown higher initiation rates for the augmented speaker than a more directive style (Miller and Kraat, UP-1984; Weiner and Kornet, UP-1983). In Light's study, most parents did not provide long pauses and opportunities for children to respond. Most partners either became impatient or felt that a response was not forthcoming, and jumped in to continue the conversational flow and exchange. Silences of more than one second were followed by caregiver talk 92.5% of the time. Caregivers repeated or rephrased their questions, initiated new topics or continued their own topics.

Taking Turn Opportunities    Obviously the natural speaker has little difficulty in taking the "speaker" role and multiple turns. In her study of augmentative interactions, Buzolich (1984) observed that "normal speakers were extraordinarily successful in obtaining turns in comparison to normal speaker interaction." It is the aided partner who is often trying to get into the conversation, stay in the conversation and interact at the level desired to achieve his or her purposes (Yoder and Kraat, 1983). It may be that there are lowered expectations for participation on the part of one or both partners (Calculator, In press; Harris, 1978; Colquhoun, UP-1982).

Within a conversational structure, the transfer of the speaker's role from one partner to another may be obligatory or optional (e.g., a question demands a response from the other person and therefore a shift in who is talking, whereas a comment like "It's hilarious!" may or may not be followed by this shift). As observed earlier, many conversations between augmented speakers and others are heavily weighted toward a question and answer routine with the natural speaker asking the questions and obligating a response. In looking at the data from some of the interaction studies with adults and augmented children, one is struck by the percentage of instances where the children gave no responses to obligatory questions. Augmented speakers gave no response to an obligatory utterance 85% of the time in the study by Harris (S2, 1978); 84% of the time in the initial phases of the study by Calculator and Luchko (1983); and 14 to 15% of the required responses in the study by Sponseller and Laikko (UP-1983). In other studies, researchers report that the augmented partner was not given an opportunity to respond a high percentage of the time (Blackstone and Cassatt, IP; Light, 1985). The figures for "no response" categories are considerably lower for other studies. Of interest are the nature of the utterances that these persons did not or could not respond to, and researchers' definitions of "no response".

How frequently do augmented speakers place obligatory turn demands on their able-bodied partners? This is difficult to extract from different coding schemas since initiation efforts or responses are infrequently examined for this type of turn exchange. Light (1985), Light, Colliers and Parnes (1984) and Kraat (UP-1979) did examine obligatory utterances for both partners. In the Light and Light et al studies, children using Blissymbolics boards in interactions with their mothers made very few demands on their mothers (10.9% of utterances were obliges). Even less were observed in the everyday converstions of an institutionalized adult either as initiations or question extensions added to a response.

Conversational opportunities are also available by taking designated opportunities for a turn that is optional. Minimal information is available to date on augmented speakers' use of these opportunities. The most extensive studies have been done by Light (1985), and Light, Collier and Parnes (1984). In these mother-child dyads within a play context, children were observed to use only approximately half of the optional turn opportunities that were available. Other studies have not looked at "turn opportunity" but have reported whether or not a turn taken was obligatory or optional. In the adult subject studied by Kraat (UP-1979), 18 out of 112 turns taken were optional.

Turn-taking types and speaker status are difficult to determine when communicative efforts of augmented speakers are unintelligible or the attempted bid for a turn is not recognized or responded to by the able-bodied speaker. These may or may not be optional turns or turns that could in return oblige the natural speaker. Although there is variability, several researchers have reported a lack of response to an augmented person's attempts at initiating communication or taking a turn. In Harris's study, a teacher did not respond to student initiations 1/3 of the time (23/68 initiations). In contrast, another student was responded to by the teacher 42 out of 46 times. In another study of classroom interaction, 61% of the students' initiations were ignored (Calculator and Dolloghan, 1982). In this study, student responses to teacher initiations were subsequently responded to more frequently than initial initiation efforts.

Turns can also be obtained through direct interruptions. In the conversations that have been studied, it is not surprising that researchers have not observed aided partners doing much of the overt interrupting. On the other hand, communication partners have been observed to frequently interrupt the ongoing utterance being made by the aided speaker. These interruptions are generally guesses and predictions, or new utterances made by the natural speaker that abort the ongoing attempt by the aided person. Several researchers have also commented on the double signals frequently given by the natural speaker with regard to turn change (Colquhoun, UP-1982; Harris, 1978; Yoder and Kraat, 1983; Light, 1985; Buzolich, 1983). That is, a natural speaker will ask a question requiring a response, and in doing so, signals that his or her speaking turn is being relinquished. As the aided partner begins to claim the turn, the natural speaker takes back the turn, asking sub-questions to narrow the field of responses, or attempts to answer his or her own question.

Buzolich (1982, 1983) examined the interruptions and overlaps that occurred between the dyads she studied in which the aided speaker used an alphabet board and then a speech output device. In this study, the natural speaker interrupted more frequently than the aided speaker. It was noted that this occurred less frequently when the independent speech output device was used. In this situation, the aided speaker was observed to gain optional speaker turns and to interrupt more often. This was often accomplished by beginning to construct an utterance independently during the natural speakers turn (i.e., overlap).

No formal studies have addressed the augmented speaker's ability to recover from a turn interruption or the kinds of devices that are used effectively to do so. Observational reports suggest that some aided speakers recover by not making eye contact with the partner during these interruptions, or by quickly returning their gaze to the language or device display. Others continue to construct the message until the partner relinquishes and attends. Persons who have direct selection systems may have stock phrases available to assist in this regulation (e.g., Please don't interrupt me; I'm not finished yet; I know I am slow, but wait a minute).

The low percentage of optional turns in the augmented-natural speaker interactions reported may be rooted in a variety of causes. Among those suggested have been: (1) lack of sufficient time to respond; (2) lack of appropriate vocabulary to intelligibly and effectively contribute; (3) rapid question-asking behaviors of the natural speaker who has a dominant position; (4) effort required in comparison with placing the conversational and communication burden on the natural speaker; (5) pre-established patterns of exchange that are primarily passive and responsive; (6) lack of experience, devices and knowledge of how to take these turns differently; and (7) lack of assertiveness or feeling of worth as a person and communication partner. These variables may be inter-related but different across conversational partners. It must also be remembered that some augmented speakers and their partners have been observed to have more balanced turn-taking behaviors. The turn-taking behavior in these dyads has not been studied.

The Sequential Patterns in Conversations Researchers have used such varied definitions of and approaches to discourse analysis that it is difficult to gain a picture of who begins a conversation, who selects the topics, how these topics are or are not elaborated, and how these interactions proceed and are ended. It appears that "initiation" refers to the introduction of a new topic in some studies (Culp, UP-1982; Calculator and Dolloghan, 1982; Calculator and Luchko, 1983; Light, 1985), topic and topic extensions in others (Colquhoun, UP-1982; Wexler et al, UP-1983), the initiation of a conversational sequence in others (Lossing, UP-1981; Calculator and Luchko, 1983), not clearly defined in others (Beuttemeirer, UP-1983; Beukelman and Yorkston, 1980) and, in still others, refers to both non-obligatory utterances and topic initiations (Harris, 1978). To further complicate the issue, these initiations and responses have been tabulated differently in many studies. These tabulations may or may not include technical or procedural exchanges along with the actual utterances and acts that were communicated. In addition, the frequency figures reported are often based on different segmentations. For example, each "unit" within a speaking turn was tabulated individually in Harris's study for initiation-response status (e.g., a natural speaker could have five initiations within one speaking turn); other researchers have tabulated a complete turn with a single initiation or response role (Calculator and Luchko, 1983).

Within the research designs used, augmented speakers have been observed to initiate conversational sequences about half of the time in a home setting (Lossing, UP-1981; Beuttemeirer, UP-1983; Beukelman and Yorkston, 1980). Infrequent initiation of conversation has been reported in the two institutional environments studied (Kraat, UP-1979; Calculator and Luchko, 1983). The reported figures are based on widely different procedures. For example, a 50% initiation figure may be based on 10 interactions (e.g., Beuttemeirer, UP-1984), or 112 aided speaker utterances (e.g., Kraat, UP-1979). Children using augmentation in school environments varied in their overall attempts at beginning a conversation and in the success of those attempts (Harris, 1978; Beuttemeirer, UP-1983; Calculator and Dolloghan, 1982). Again, it is nearly impossible to extract a unified interpretation because of the multiple coding and tabulation used.

Minimal information is also available on who or how augmented-natural speaker interactions are terminated. Kraat (UP-1979) reported that all of the conversations observed in her subject were terminated by the natural speaker. This adult used a motorized wheelchair and could have physically and communicatively ended the conversation. It is thought that independent mobility may have some influence on who begins or ends a conversation. Butler (1984) examined the impact of powered wheelchair mobility on self initiative behaviors of six children between the ages of two and three, who were able to speak. Two of those chldren showed marked increases in their communication interactions (one child increased 31%, the second 27%). The children showed several social and cognitive gains, including interactions with unfamiliar people after independent mobility was introduced.

Aided speakers do initiate topics and subtopics, but less frequently than their partners. In the study by Colquhoun (UP-1982), 16% of the utterances made by the Blissymbolics users were topic or subtopic initiations. In the study by Culp (UP-1982), 13.8% of the children's utterances were new topic initiations. However, many of these studies suggest that once the topic is introduced, it is maintained and elaborated by the natural speaker and minimally expanded across the discourse structure in terms of communicative acts.

Buzolich (1982, 1983) has done the most extensive study to date on topic initiation and development. Using the categories developed by Corsaro (1979), she analyzed the topic-related acts and responses, topic shifts and off-topic acts and responses occuring in adult-adult dyads. In her pilot study (1982), both partners appeared to contribute rather equally to the initiation and extension of topics when the aided speaker used an alphabet board. When a HandiVoice device was used, this balance became more asymmetrical, with the natural speaker contributing a larger portion of topic initiations and extensions and the aided speaker contributing a greater number of minimal responses (i.e., only what was required). The reasons for this discrepancy are unclear. They may include the fact that the alphabet condition was first; the partners were unfamiliar to each other; the nature of the topics under discussion; or the impact of a slower rate of delivery and silence gaps in HandiVoice message construction. Buzolich also noted the presence of off-topic comments made by the natural speaker (e.g., comments about the communication process or setting). Other professionals have noted the intrusions and off-topic comments that seem to occur, particularly during the use of technical aids in which there is independent message construcion going on. This might be the introduction of a new topic by the "listener" or, again, comments about the interaction process (e.g., "That looks like it's going to be a long one.").

Some researchers have attempted to analyze the nature of the turn sequences that occur across a conversation or segment of conversation. That is, how are these transfers most likely to take place in a dyad? Light (1985) has examined two- and three-turn segments that occurred with the most frequency in the mother-child interactions she studied. Four of the five most frequent patterns for two-turn caregiver-child exchanges were parent obliges and child responses or attention with no response. Three-turn sequences usually involved the parent responding to the child's response with another oblige. Buzolich (UP-1982) looked at three-turn sequences in her adult-adult data to examine the degree to which arching and chaining through questioning (Mishler, 1985) were used to sustain the conversation. Buzolich observed minimal use of chaining (i.e., attaching a question to a response) by the device users in order to extend conversation.

The studies of Calculator and Dolloghan (1982) and Beuttemeirer (UP-1983) have approached turn sequences from another perspective, that of the success of sequential turns. Success was defined according to the consequences of an action by the other partner. For example, requests for clarification, requests for mode change, off-topic introductions and ignores were considered unsuccessful although turn exchange and responding were going on. In the children and classroom interaction studied by Calculator and Dolloghan, the children were successfully responded to more often when they were in the respondant verses the initiator role. Beuttemeirer found her subjects to have a more successful response when initiating than did Calculator and Dolloghan. However, these studies have very different turn and utterance frequencies.

Several researchers have noted the disproportionate number of utterance acts within the turns taken by the aided and natural speaker (Harris, 1978; Culp, UP-1982; Lewis and Ripich, UP-1983). Again, this comes as no surprise given the extensive differences in the rate of communication between the partners, the form and content needed to respond to many of the questions posed by natural speakers and/or the reduced vocabulary sets available.

Transfer of Initiation and Control   Natural speaker interactions generally have a balance between partners as to who has the discourse control at any time as well as the sharing and exchange of this control over the course of the conversation. This balance may be uneven in specific situations in which one partner has a dominant social role, or in particular types of conversational exchanges (e.g., in an interview, classroom instruction, play with a dominating peer). However, initiation and control are generally shared in the majority of conversational interactions. In several of the interactions between aided and natural speakers, discourse control has been observed to be highly unbalanced. The natural speaker dominates and there is little sharing of initiation and control.

Researchers at the University of Seattle, Washington (Lynn Farrier, Nola Marriner, Kathryn Yorkston and David Beukelman) have become interested in studying certain aspects of control in the discourse patterns of able-bodied persons using communication technology and in interactions involving augmented speakers themselves. The particular measures used to represent discourse control are: the total number of words, the percentage of time the augmented speaker is in the role of responder or initiator, the number of initiations requiring an oblige, and the number of responses in which an obligatory question is directed back to the partner (recodes). Some preliminary findings are available with regard to the way in which able-bodied speakers alter their behavior in a direction-giving and decision-making task when one partner is using a printout device (Farrier et al, IP). Partners who showed balanced participation in the tasks when using natural speech, markedly changed this balance in the augmented-natural speaker interactions. This was reflected in the number of total words used and the percentage of initiations versus responses made. Speakers used fewer words and initiated less when placed in the augmented versus natural speaker roles. This transfer of control to the able-bodied speaker was more pronounced for the direction-giving task than the decision-making task (Personal communication - K. Yorkston, N. Marriner). In their continued research, it will be interesting to see the relationship between the findings on "simulated" non-speakers and the performance of augmented speakers (Yorkson et al, IP).

The relationship of conversational control to effectiveness and efficiency in conversation needs further examination. Colquhoun (UP-1982) pointed out that "observation of a conversation between a Blissymbol user and a speaking person gives the general impression that effective communication is taking place and that one participant is not totally dominating the interaction". This observation was made of interactions in which the natural speakers asked most of the questions and the aided partners frequently responded to those questions. It may be the case that giving the control to the natural speaker is an effective conversational strategy for some dyads in certain situations (Personal communication - S. Wollner; Weeks et al, 1974; Beukelman and Yorkston, 1980). It may be that at times the augmented person's intention can more quickly be realized by elaboration and questioning than by taking the time to produce a full utterance. At other times, vocabulary restrictions may also contribute to this discourse strategy and pattern. It is not an effective conversational strategy when the able-bodied person is a poor question asker or verifier, and does not let the augmented speaker add and elaborate. Or, if the augmented partner is not given an opportunity to contribute when intentions can be more clearly conveyed in that manner, or may even be more efficiently realized. Colquhoun (UP-1982) has also suggested that the overuse of this question-answer structure may prevent an augmented person from learning how to cope effectively with partners and situations in which effective questions are not automatically asked (Colquhoun, UP-1982).

Partners as "Listeners" Both partners in a conversation mutually influence each other in a reactive and interactive manner. The degree of interest someone has in what is being said, and in continuing the conversation are signaled through a variety of verbal and non-verbal behaviors (Duncan and Fiske, 1977; Payotos, 1980; Higgenbotham and Yoder, 1982). These backchannel or feedback signals may be projected through body shifts, eye gaze, verbal feedback (e.g., Huh? Yeah; Mm-hm), head nods, facial expression, laughter or body movements. These signals serve a variety of functions in natural discourse, among them providing feedback regarding the comprehension or intent of a message, encouragement and a signal to begin closing procedures.

Buzolich (UP-1982, 1983) examined the use of these backchannel responses for both natural and augmented speakers in the two dyads she studied. The coding categories and behaviors used for natural speakers were modified for the study of augmentative interactions. In this different form of interaction, feedback has been observed to be used extensively in the co-construction of utterances (technical aspects) when the partner needs to acknowledge a message element (e.g., letter, word) and for general communication feedback. The modified coding schema created by Buzolich included these technical communicative behaviors and vocalizations. Feedback behaviors were compared for the alphabet board versus HandiVoice conditions. In the pilot study (1982), feedback was more frequently used by both partners in the the board condition. This difference may have been due to the newness of the partners, or the backchannels needed in the board condition. Buzolich also observed that the aided speaker used more non-verbal and vocal feedback signals in both conditions, and less verbal feedback in the HandiVoice interactions. She conjectures that the use of linguistic feedback through the device would have unnecessarily disrupted the conversational flow.

Several observations have been made about the lack of feedback on the part of the augmented person as a "listener" (lack of facial expression, eye contact or vocalization). It has also been observed that the feedback behaviors of natural speakers are often detrimental to the interaction, for example, when they give the impression of frustration or annoyance and that there is no time for an extended conversation. How and to what extent these behaviors influence the communicative actions of the natural and augmented partner remain open to study.

## Communication Breakdown and Resolution

Interestingly enough, we know more about our problems and failures than we do about the various levels of human communication that have been successfully achieved. Several areas of difficulty and concern have already been identified throughout the report. Additional information on communication breakdown will be presented here along with some of the resolution strategies observed to date.

How much difficulty do augmented speakers appear to be having in communicating? Little is known about what an augmented speaker does not attempt to do because of system constraints. Much more is known about specific and observable problems in a conversation, termed "communicative breakdowns". These breakdowns can occur at multiple levels in an interaction from difficulties in gaining attention, to problems in conveying particular vocabulary items or utterances, to misunderstandings of communicative intentions or difficulties in handling discourse structure. Again, in reviewing current research the definition of a breakdown is varied among researchers. The term sometimes refers to the understandability or success of a single speaker turn; in other instances, the term is only used if the whole utterance or communicative act is not understood or actualized. Some of these definitions can be found in Appendix D of this report. The analysis used by Mathy-Laikko and Ratcliff (UP-1983) is of interest as a way of organizing and identifying these multiple communication problems.

Regardless of the definitions used, the frequency of occurrence of unintelligible responses and communication breakdowns appear to be excessively high in the interactions of augmented speakers. In the studies that involved augmentative speakers who primarily use non-alphabet systems, the figures are especially large. Culp (UP-1982), in studying 20-minute segments of interaction between five mothers and their children, noted that 24.4% of the utterances of the children were unintelligible or "no response". She noted that many of the "no responses" may have been due to the lack of time given for these children to respond. Light (1985) also tabulated a similar percentage in the mother-child interactions she studied. Of the children's utterances that were coded, 23% were unintelligible (i.e., the intent was unclear or the utterance misunderstood). Several of these were verbal attempts on the part of the children. Huschle and Staudenbaur (UP-1983) analyzed two 20-minute segments of interaction with an augmented adult (primarily a non-speller) in conversation with an unfamiliar and familiar partner. Using the coding system developed by Fishman and Timler (UP-1983), they identified 16 overall breakdowns (35% of the utterances exchanged with the unfamiliar partner; 24% of the utterances with the familiar partner). In the unaided condition studied by Wexler et al (UP-1983), 188 uninterpretable communication attempts (i.e., partners guessed or asked for clarification) were coded across the ten dyads. This number was tabulated on ten minutes of interaction for each dyad.

The studies involving persons who use alphabet or phoneme systems and/or independent output devices (electronic/computerized aids) are fewer. The occurrence of unintelligible responses reported in these studies is much less. In the Wexler et al study (UP-1983), the number of unintelligible attempts dropped from 188 to 20 once the alphabet board was introduced into the interaction. Buzolich (UP-1982, 1983) noted a reduction in difficulties when an electronic device (i.e., HandiVoice 120), as opposed to an alphabet board, was used by two augmented speakers. In the pilot study (1982), the partner asked for 15 clarifications when an alphabet board was being used and none when the speech output device was used.

Several types of communication difficulties have been observed. These range from situations in which no response is given when one is expected, to communicative efforts that go unrecognized, to elements that are not understood or are misunderstood, to utterances that are incomplete. The source of the problem may lie with the aided speaker, the partner, the augmentative system, or a combination of these. When these difficulties are recognized by either partner, a process of resolution may be implemented. In collaboration, the two partners may resolve the problem easily and quickly (e.g., "H?" "No, L."), take several turns and strategies to establish the intended meaning, or never come to a resolution.

A large proportion of the problems noted have been difficulties in bringing a proposition to a realization. In other words, there is a lack of comprehenson of the words that make up the message. Augmented speakers may attempt to use their severely dysarthric speech as a communication mode and it may not be understood (Bailey and Shane, UP-1983; Huschle and Staudenbaur, UP-1983; Light, 1985). A person communicating through direct selection on a language or alphabet board may indicate items too quickly for the receiver to combine and retain these elements (Beukelman and Yorkston, 1980), or may have motor difficulty in identifying an element precisely (Waldron, Gordon and Shane, UP-1980). The partner may also have difficulty in knowing which item is identified when an open-handed posture is used, or as an augmented speaker moves across several items on the board (Morningstar, UP-1982). Huschle and Staudenbaur (UP-1983) and Mathy-Laikko and Ratcliff (UP-1983) cite an example of an adult trying to indicate the word "cook" by spelling. This augmented speaker ran into communication difficulties in trying to indicate a double "o" as his second indication movement was not understood by his partner. It has also been noted that an augmented speaker may not indicate that a spelled word or utterance has been completed before a second one is begun (Calculator and Luchko, 1983). This may be due to a lack of "space" or punctuation in the language available, a lack of non-verbal cueing at these junctures (e.g., looking up at the partner) or ignoring these items.

Co-construction of messages requires that the speaker and the receiver confirm and verify with each other as the message elements are produced and received. These technical rules may be ignored and cause communication breakdowns. Silverman, Kates and McNaughton (1978, p. 407) provide a classic example:

Speaker: "When's the holiday?"
Aided speaker: (Using Blissymbolics board)
Month. O.
Speaker: "Month O? I don't get you Joey.
Try to form a sentence with it."
Aided speaker: O - O - O (Pounds 3 times on the letter)
Speaker: "Does the month start with an O?"
Aided speaker: Yes.
Speaker: "October?"
Aided speaker: Yes
Speaker: "So, a holiday in October. Uh, let's see.
Oh, I know. Thanksgiving. (Canadian)
Do you like turkey as much as I do?"
Aided speaker: H.
Speaker: "H? I don't understand. What does H have to
do with Thanksgiving?"
Aided speaker: (No response)
Speaker: "Do you know the story of Thanksgiving?
About the Pilgrims and Plymouth Rock and
all of that?"
Aided speaker: (Expresses frustration)

In this exchange, the natural speaker made a guess that the holiday the augmented speaker was referring to was Thanksgiving and continued on the topic without verifying it. The augmented speaker, on the other hand, did not successfully communicate that this was a miscommunication. This type of breakdown in communication (lack of verification, no signal that a problem in communication had just occurred) has been mentioned by several participants in the study, and observed formally in the study of Bailey and Shane (UP-1983).

Communicative breakdowns may occur between augmented speakers and partners who are less familiar with each other because inappropriate assumptions are made about shared referents, or the partner is unable to technically follow the communication and conversational rules that are different. Non-verbal referents and movements may be ignored or misunderstood (Morningstar, UP-1981; Morris, 1982; Calculator and Dolloghan, 1982; Harris, 1978; Yoder and Kraat, 1983; Higgenbotham and Yoder, 1982; Blau, 1983(a); Miller and Kraat, UP-1984). Vocalizations may or may not be recognized or thought of as communicative. The particular symbol forms (e.g., Blissymbolics, Sigsymbols, orthography) or symbol strategies used may not be part of the shared reference between two speakers. For example, in the study by Morningstar (UP-1981), the semantic combining strategies in Blissymbols were misinterpreted by many of the less familiar partners.

Intelligibility problems can also be a part of an interaction when one partner is using a synthetic speech device. Although the quality of synthetic, portable speech systems is improving, the intelligibility of the synthesis available in communication devices is far below that of natural speech. Several studies of synthetic speech intelligibility have been conducted or are in progress using a variety of synthesizers applicable to augmentative communication systems (Chial, 1976, 1984; Easton, UP-1984; Levinson and Kraat, IP; Morgan and Wolff, UP-1983; Nielsen, UP-1979; Wieck IP; Pisoni and Hunnicut, 1980; Slowiaczek and Nusbaum, 1983; Williams, Simpson and Nordinger, 1981; Pisoni 1981). Intelligibility ranges from 10 to 94% depending on the synthesizer studied and the research paradigms used. Intelligibility scores may improve for those exposed to this mode over time. However, some listeners appear to continue to have difficulty (Easton, UP-1984). Morgan and Wolff (UP-1983) examined the ability of developmentally disabled adults (potential communication partners) to understand synthetic speech presented via the Votrax Personal Speech System. In their findings, the reading level of the listener appeared to have a relationship to how well they were able to understand synthetic speech.

The relationship between isolated scores of intelligibility and comprehensibility in everyday conversational contexts is not well understood. Luxton (UP-1983) studied the ability of blind and sighted adults to comprehend rather complex written material (Sequential Test of Educational Progress, grades 13 and 14) presented by the Kurzweil Reading Machine. Synthetic speech presentation negatively affected comprehension scores. The synthetic speech mode was particularly detrimental to adults with low verbal scores on the Wechsler Adult Intelligence Scale. Subjects reported particular difficulty with the lack of inflection, unexpected mispronunciations, and occasional shifts to oral spelling. Pisoni and his colleagues at Indiana University (USA) have proposed that different processing models and strategies are utilized in understanding and comprehending synthesized speech (Pisoni, 1981). They suggest that the listener necessarily spends a lot of processing time decoding acoustic signals and this in turn impacts on that person's ability to comprehend and process information. A comprehension task has been developed by Lucille Punzi (USA-Queens College) to test the ability of children between the ages of 4 and 6 in comprehending synthetic speech devices in a natural play context. Preliminary findings suggest that contextual support in everyday environments considerably improves the understandability of this type of speech communication, but that a comprehension gap still remains between natural and synthetic speech presentation.

Other difficulties in conveying meaning appear to be related to the fact that an augmented speaker may be trying to produce an utterance with a restricted vocabulary set. In doing so, the listener may take the message literally and a communication breakdown occurs. For example, a child might point to a picture of drink represented by a glass of orange juice when he wants another drink such as chocolate milk (not available on the board) or something from the refrigerator not represented on the language display. In another example, a young child indicated the symbols "Mommy" and "goodbye" as the mother and teacher were talking. The mother immediately reacted in a hurt manner saying to the child, "That's not nice! You want Mommy to go away...." The message the child was in fact trying to convey was an impatient, "Let's go, Mommy." However, "let's go" was not available to him, and when he used an alternative his mother misinterpreted the intent and meaning. Restricted vocabulary sets and wording may also create misunderstandings when stock phrases or words are not socially appropriate to a particular setting. For example, use of the available word "Yuk!" may not be the best way to tell someone you do not like the food they made you. Or saying, "Stop, I have something to say!" to interrupt or to get a communicative turn may be interpreted as rude and socially inappropriate in a place of employment.

Although not formally studied to date, several professionals have observed difficulties in establishing the communicative intentions of one- and two-word utterances on the part of children using augmentative systems. Able-bodied children often use environmental support (e.g., holding up a toy car; pointing to a dog) and intonation patterns to suggest the types of intention meant. These supports are frequently unavailable to physically disabled children. Consequently, these early developing utterances may often be misunderstood by the partner. In one example, a young boy and his mother were shopping in a department store. The child gained the mother's attention and pointed to the symbol "elevator". The mother assumed this was a request for action, and responded, "You can ride on the elevator when we go home." In fact, the child may have been attempting to convey a variety of communicative functions. He might have been asking a question (e.g., "Is there an elevator here?"), making a comment (e.g., "Mommy, I love pushing the elevator button.") or attempting other communicative functions and propositions.

Before a miscommunication can be resolved, the partners have to indicate to each other that a problem in communication exists. When the augmented speaker produces an utterance that is incomplete or unclear to the "listener", the able-bodied partner signals this in a variety of ways. These include using a rising inflection pattern (e.g., "Home?"), directly indicating a lack of understanding (e.g., "Huh? what? I didn't get it.") or asking for further information and expansion through a variety of questions. It may be somewhat more difficult for the augmented speaker to signal the communicative breakdown when a partner misunderstands a communication effort or elaborates on an utterance and does not verify or check with the speaker. Some non-speakers are not provided with the vocabulary to signal a breakdown or to locate that misunderstanding (e.g., they do not have a phrase such as, "That's not what I meant", or "I'll tell you where the problem is. Say it back one word at a time."). Consequently, the miscommunication continues and is expanded with no observable identification of a problem.

Once a miscommunication has been mutually identified, the process of resolving the problem can be initiated. In able-bodied speakers, the person making the unclear statement or miscommunicated statement takes primary responsibility for the repair of that communicative effort. In other words, if the "listener" responds with, "I don't get it", or adds an utterance to the conversation that shows he did not understand, for example, "You want me to go to the vault?" the partner then proceeds to clarify. For example, he may say, "No, I want you to get the copy of the contract that is in the vault", or repeat or rephrase the initial utterance. In conversational breakdowns between augmented and natural speaker interactions, the aided speaker may or may not be able to repair the miscommunication. Both Light (1985) and Huschle and Staudenbaur (UP-1983) remark in their interaction studies that the children they studied had a reduced number of linguistic and non-verbal strategies available to repair communicative breakdowns. Calculator and Delaney (UP-1984) observed that their subjects were able to make developmentally appropriate repairs.

It is often the case in augmented-natural speaker interactions that the "listener" having difficulty in understanding may become an active participant in the resolution, either because of expediency or the lack of vocabulary available to the aided speaker. This, again, is an unconventional role for a communication partner accustomed to the rules for resolution in natural speech exchanges. Listeners employ a variety of strategies to rectify problems, some of them constructive and some of them ineffective. Partners have been observed to attempt repair through a series of yes/no, "Wh", and forced choice questions or by asking the aided speaker to assist by repetition or by providing a certain type of hint or mode use. For example, asking a child, "Can you give me a word on your board?" "Try to spell it", or "Look at it again" (Bailey and Shane, UP-1983; Husche and Studenbaur, UP-1983; Beukelman and Yorkston, 1980).

The differences among partners in their ability to resolve miscommunications is noted by researchers, both with regard to the number of turns taken, the time needed to resolve a breakdown and the ultimate success of that effort. Huschle and Staudenbaur (UP-1983) and Bailey and Shane (UP-1983) both noticed a large proportion of unproductive questions and guesses in one of the partners studied as compared to the other. Beukelman and Yorkston (1980) found that one of the four partners studied was particularly ineffective at resolving communication breakdowns. During a 16-hour period, the husband and speech pathologist successfully resolved all communication problems with an adult woman with spelling capability. One of the attendants (P3) solved all but four. However, another attendant (P2) was particularly poor at interacting and resolving communication difficulties and left 20 efforts unresolved. It is interesting to note that three of the four partners successfully resolved the multiple breakdowns. However, these resolutions were accomplished through very different partner strategies.

## Attitudes

Social interaction, or the lack of it, often reflects attitudes that partners have toward themselves and others. Several dimensions of attitude have been previously discussed in Chapters II &III of this report. In this section some observations and research findings will be shared that relate more directly to the expressed attitudes of people toward augmentative communication devices, device characteristics and augmented speakers. This section is particularly influenced by conversations with Alan Newell, David Yoder, Anne Warrick, Yovonne Diajuma, Evacarin Holmquist, Roger Allen, Margita Lundman, Howard Shane, Bob Fawcus, Karoly Galyas, Carol Prutting, Dorothy Rutrick, John Vincenti, Gregg Vanderheiden, Jim Brooks, Denise Okun, Sallie Dashiell, David Beukelman and Ricky Creech.

## Attitudes Toward Augmented Communicators and Interactions

Buzolich (UP-1982, 1983), Prutting and Kirchner (1983), Holland (1982) and Preisler (1984), among others, have found value in studying interactions from both a holistic (macro or molar) and an in-depth analysis (micro or molecular). An in-depth analysis provides the researcher with extensive information about details within an interaction sequence (e.g., pause time between speaking turns, the number of requests for interaction, how eye gaze was used). However, one must then interpret those behaviors in an interrelated and integrated manner. How was the interaction holistically viewed by the participants? By others who might be observing it? What impressions did the communication partners make on each other?

Buzolich (UP-1982, 1983) performed both a macro- and microanalysis on the interactions of two adult dyads, and attempted to look at the relationship between observations made in the in-depth analysis and the overall impression or collective impact of these behaviors. Some of the measures used in the macroanalysis are contained in Appendix E of this report. The question Buzolich asks is an important one. That is, what is the social validity or holistic outcome of adaptations made in augmented-natural interactions? What differences make a difference? The answers to these questions are of great importance to the study of communicative interaction and the models we use for device-matching and intervention procedures.

In the pilot study (Buzolich, UP-1982), participants in the interaction appeared to focus on the parameters of rate, intelligibility and role relationships in making judgements about the quality of both letterboard and speech output interactions (i.e., letterboard and speech output). A different macro measure was used in the dissertation study (Buzolich, UP-1983). In this research, one dyad was perceived to be more competent and proficient than another by persons viewing videotapes of the interactions. It appeared that one aided speaker used different strategies than the other in handling conversational interactions, and was more "proficient" in device use. The specific behaviors contributing to those judgements and the relationship of macroanalyses to microanalyses can be obtained from the researcher.

Goffman (1959) discussed the concept of "presentation of self" in his classic book. Communication is one way in which we present ourselves to other people in this world and attempt to influence what they see and think of us. This presentation is made in several ways including our choice of words, our tone of voice, the attitudes we display and the topics we choose. In an attempt to understand the differences among augmented speakers and the apparent differences in their social and communicative competence, one might look at how these individuals differ in their "presentation of self".

Some augmented speakers appear to be more assertive than others in taking and making opportunities. Some seem able to captivate others through their facial and body expressions, their use of humor, speaking style, sensitivity and what they have to say. I am reminded of a particular non-speaker in a large hospital who had only a few gestures, vocalization and facial expression, yet was sought out to socialize with by staff and other residents. In Michigan, I spent a morning with an adult who had only an attention-getting buzzer available to communicate through. He managed to get into a group conversation by reacting to what others were saying with varied types of beeping representing, "Yeah," "Yes!" "Yuk!" and "Well..I agree." The list goes on. A small child, coming up to me in Craig-Y-Parc school in Cardiff, started a conversation with his Blissymbolics board that continued for a delightful half hour. Children in New York, Cleveland and Madison were active partners with their communication systems--chatting, teasing, lying, creatively playing--all in very human and engaging ways. One also sees the opposite: a lack of identification with a communication device, little effort and desire to participate and a preoccupation with oneself and disability. One of the reasons for these different profiles may lie in the augmented person's sense of self as a person, speaker and social partner.

Communication is one avenue through which attitudes can be changed (Goffman, 1976; Creech, 1982). It is quite probable that by providing a particular vocabulary set (or alphabet/vocabulary storage) and knowing when and how to effectively use this language, an augmented speaker could considerably alter attitudes and the level of interaction. In this respect, non-verbal expressions and behaviors are equally important.

Howard Shane brought the work of Wolfensberger on "normalization" to my attention during this study. The principle of normalization has been a conceptual model for a segment of human services (Wolfensberger, 1972; Bank-Mikkelsen, 1969) over the past 15 years. In a somewhat oversimplified manner, normalization can be defined as "utilization of means which are as culturally normative as possible, in order to establish and/or maintain personal behaviors and characteristics which are as culturally normative as possible" (Wolfensberger, p. 28). Wolfensberger goes on to suggest realism in the potential behaviors that are possible, with attention to characteristics and behaviors which mark a person in the view of others. Dr. Shane expressed the opinion that communication technology and the social use of language has the potential to bring greater normalization to many non-speakers since they can participate in one of the most central of human experiences.

The normalization concept has been raised in relation to specific behaviors of augmented speakers. It may be the case that certain verbal and non-verbal behaviors may contribute highly to a person's "social identity" as an intelligent human being who happens to be handicapped, and others may detract from that identity. The characteristics projected by an augmented person may not impact equally on a partner or potential partner. Ann Warrick shared an interesting example. Severely athetoid arm movements may have a denormalizing effect on a partner and an interaction. However, the same augmented speaker communicating through an Etran eye-pointing system, which minimizes involuntary body movement, may create a quite different impression. David Yoder has questioned whether or not particular vocalization patterns, the lack of eye contact or particular facial expressions might also be salient characteristics in reduced or partner specific social interactions. It may be fruitful to find a methodology to weigh behaviors or characteristics in terms of their effect on attitudes. Such information could provide guidance for both the selection of augmentative systems and for determining which behaviors, if modified, would have the biggest social and interactive payoff.

The concept of normalization has been raised in relation to specific behaviors of augmented speakers by other professionals in the study. Anne Warrick has shared her feeling that body image and first impressions are important to social communication. Consequently one might want to take this into consideration when selecting augmentative techniques. She gave an example in which a choice of using severely athetoid movements of the hands to indicate language elements or an eye-pointing system where there is much less involuntary movement. The latter presents the augmented speaker in a much more physically normalized manner. David Beukelman also proposes that "normalizing" behaviors be shaped when possible. He cites the example of a dysarthric woman seeking employment. Although her speech had several dysarthric characteristics, they did not impact equally on prospective employer's attitudes. Characteristics of her voice quality appeared to be reacted to most negatively. These examples raise our consciousness. There is a need for methodology to determine which behaviors have the greatest impact on social interaction and attitudes, be it the content and wording of what is said, the appearance of the device, the involuntary movements, syntax or unnatural vocalizations.

## Attitudes Toward Device Characteristics

Coxon and Laikko (UP-1983) examined the attitudes of a group of unsensitized and sensitized adults to a videotaped conversation between a natural speaker and an able-bodied simulated augmented speaker who was using the Express 3. Each subject viewed a single interaction in which the aided speaker was communicating through synthesized speech, print or visual non-retrievable output. On a rating scale, the unsensitized listeners reacted negatively to all three output modes, and most negatively to the printed form of communication. This unfamiliar group also indicated that they would not be inclined to make the first communicative move with the augmented person. This study suggests that the augmented speaker would have to be assertive and open a conversation with an unfamiliar adult if a conversational interaction was desired. The sensitized group had a much more positive attitude toward the interactions and all three output modes. Graduate students at the University of Wisconsin have also looked an naive persons' reactions to a person using sign language, Bliss, an AutoCom and the Canon Communicator. In their survey, potential partners expressed a preference for sign, followed by the two electronic devices and lastly the Blissymbolics board.

In another study by Ewing (1975) the attitudes of medical staff and patients were polled regarding their perceptions and personal preferences for augmentative means used in an acute medical setting. Augmentation was used in this situation for persons who had temporary or permanent aphonia. Of the communication means used (an electrolarynx, pencil and pad, sign language or articulating without sound), both staff and patients showed a preference for electrolarynx use. It appears that this preference was due to the ease and quickness of speech and the intelligibility afforded over "mouthing".

In Buzolich's studies (UP-1982, 1983), she examined the perspectives of both participants in interactions in which an alphabet board and speech output device were used. In this context, both adults were unfamiliar with each other. In the 1982 pilot study, the natural speaker reported that interactions involving the alphabet board were more satisfying, more comfortable and more natural with respect to the flow of the conversation than the interactions involving the HandiVoice. She felt that she was in control as she participated in the formulation of her partner's messages on the board. At the same time, the natural speaker felt that the speech output device was more satisfying and liberating to the aided communicator, and that he appeared to present an altered sense of self-presence when using it. The adult using the two different communication devices preferred the speech output aid. In general, he felt more dominant and in control of the conversation when using the alphabet board than he did when using the speech output device. However, his preference centered around the greater independence it afforded him and the reduction in disruptive guessing on the part of the natural speaker. The sense of independence and control through the use of electronic and computerized devices has been mentioned by other users.

However, several users, partners and professionals have also reported a preference for non-electronic forms of communication and non-verbal behaviors, at least for some social situations. These opinions are generally expressed in reference to direct selection systems. Harris (1982) notes that some electronic devices seem to "take the social out of interaction". In discussions as to why, the words, "more intimate", "more personal", "more drawing in" were used. Partners express a feeling that communication is occurring faster and that they are actively involved in that exchange. Gregg Vanderheiden (Personal communication) suggests that even though the overall rate of communication may be the same when producing the utterance a letter, word or sentence at a time, the partner perceives the letter-by-letter or word-by-word production to be much faster. He proposes that this is related to the partner's ongoing involvement in comprehending as opposed to being silent and waiting for an utterance to be produced. Several other differences between independent and non-electronic devices have been noted that may also create this attitude. Among them are the closer proxemics involved in using non-electronic means of comunication, privacy and often the increased rate that can come from fruitful prediction.

Several opinions have been expressed about conversing through synthetic speech, visual displays and printers. They come from augmented speakers as well as those on the receiving side of the dyad. While some aided speakers and partners have a negative reaction towards synthetic speech, and others do not. The reasons are not at all well understood. Evacarin Holmquist expresses her feelings about synthetic speech in the following way: "I must confess, I can't identify myself with the voice. Can you imagine calling a person you like (especially if he is male) and ending up the conversation with, 'Take good care of yourself' (in a synthetic voice). She also expressed frustration at the poor intelligibility of synthetic speech, especially for people who are not used to listening to it. Different speech qualities may elicit more positive or negative responses from communication partners and users, or may more readily create a self-identity in the user (Blood and Blood, 1982; Personal communication - B. Fawcus, A. Newell). For others, speech synthesis has added an element of social control and independence, and has become an important part of their communication repertoires and identities. We need to understand the social and communicative differences.

Persons who predominantly use print as a mode express several feelings about this medium. Some feel that it gives them the opportunity to express themselves in a more normalized manner when they are not engaged in face-to-face interaction (e.g., constructing an utterance and then presenting it). With the advent of greater storage capabilities in print and speech output devices, this may be a concern related to device storage rather than mode. Some users have experienced difficulty in expressing intentions in print since messages appear to be taken more formally when presented in this mode. There is also a potential lack of privacy, particularly for users of scanning devices, since anyone can read private messages and seem to feel free to do so (Newell, 1984; Yoder and Kraat, 1983). Several participants in this study have suggested that an utterance may have different impacts when presented in different forms (e.g., "Hi", an expression of anger, or a witty quip; information given in slowly constructed speech versus print).

The impact of design features on a partner's or potential partner's perception of the aided speaker or on a user's self-identity has not yet received formal research study. Levy and Waksvik (1973) expressed concern that in the development of rehabilitation technology, designers are not addressing the individual's self-identity and possible alienation. Obviously this is but one aspect of projection and attitude formation. However, the physical appearance of a communication device may convey specific attitudes about an aided speaker and therefore influence conversational and social expectancies. A recent study by Bates et al (1984) examined reactions toward a person with Down's syndrome presented in an age-appropriate, functional and integrated manner. This was contrasted to attitudes formed when the same child was shown in situations which were not age-appropriate, child-like, and segregated. The use of appearance and non-verbal cues can be a powerful tool to establish social roles and status (Pettygrove, 1985; Brown, 1981). As a field, we need to understand the impact of sloppily constructed language boards, words and symbols that project a below age-level image, and the designs which can establish more appropriate projections. It is quite possible that some overall designs are more "normalizing" and invite more social interaction than others.

## The Impact of Intervention on Training and Interaction

Until recently, most of the training programs for children and adults using communication devices focused on acquiring the skills necessary to use the indication technique and identify language symbols. A large portion of the training time with persons with developmental disabilities also addressed language development. In particular, the forms used in communication (e.g., syntactical structures of varying complexity, increased length of utterances and vocabulary words). Much of this training was based on the assumption that augmented speakers needed to acquire the "tools" of language, and that conversational use similar to that of natural speakers would automatically follow. The same model and assumptions were applied in training programs for persons with acquired speech disabilities.

Interest and research in the use of language in everyday social interactions is gradually transforming our perceptions of what should be taught and how it should be taught. We are beginning to realize the complexity of actually applying and using language form and content in natural situations, for natural speakers as well as for those using augmentation. What is said, how it is said and when it is said is encased in a complex scaffolding of social and discourse rules. One may know the syntactical forms and vocabulary of a language, but have little knowledge of how to apply these to express a variety of meanings and impressions when confronted with a particular speaker, his or her utterances and the situation. Supplying a person with a communication device and providing training in symbols, syntax and switches is simply not enough. Granted, some augmented speakers manage to acquire remarkable conversational skills with a minimum of training beyond these basics. However, a large percentage of adults and children desperately need more. With these individuals, communication systems are often being minimally used in view of their potential for facilitating human interaction and participation.

The realization that interaction and the interactional use of a communication system is an important and integral part of training and intervention is relatively new to us. We are at a turning point with much discussion about what should be taught, the models it should be based on and how it might be taught. The unanswered question is how many of our observations on interactions between augmented speakers and others have been influenced by our training or lack of it. Can we influence and improve social and conversational interaction through particular intervention and training paradigms? For example, through appropriate training, can aided speakers introduce and develop their own topics more effectively, take turn opportunities when they are not required, extend the length and levels of social interactions, and express a variety of utterances and intentions more efficiently and clearly?

There seems to be a general feeling among participants in this IPCAS project that our training is partly responsible for the poor and mediocre communication performances that we often see in augmentative-natural speaker interactions. Our training to date has not been wrong, but it has not been broad and comprehensive enough. Training needs to encompass language development as well as interactive use in everyday situations. Much discussion also centers around the models that we might be productively using to guide us in future training, both as a conceptual framework and for specific intervention procedures. Several published materials also raise questions about our training and isolate areas of concern in that training process (Calculator, 1984, 1985 in press; Goosens and Kraat, 1985; Harris and Vanderheiden, 1980; Bolton and Dashiell, 1984; Verburg, 1984; Yoder and Kraat, 1983; Rush, 1983; Turner, 1981; Kraat, 1982; Shane, Lipschultz and Shane, 1982).

The research involvement with regard to the training of interactive skills is minimal. Some studies in progress have been identified during this project (e.g., Barker and Henderson, IP; Light, Collier and Parnes at the Hugh MacMillan Medical Center in Toronto; Delva Culp in Dallas, Texas). Four completed studies that specifically address interaction and training have been found. Three of these are data-based studies which demonstrate the influence of specific training procedures on the nature of the interactions that take place. Reichle and Ward (1985) taught a 13 year old boy a procedure by which he learned in what contexts to use signing or an alphabet printout device. Although the boy had been a signer for approximately three years and a user of the communication device for one, he did not appear to have any systematic strategy for mode use. The augmented speaker was taught to ask his partner through orthography whether or not signs were understood. Contingent on the answer, the conversation proceeded with the appropriate mode for that situation. This strategy was generalized to a variety of partners and novel situations. Obviously, in this case, specific training was needed for the aided speaker to adapt to situational differences and increase his effectiveness.

The single case study by Calculator and Luchko (1983) poignantly illustrates the need to evaluate communicative interaction in the natural environment, both for baseline and treatment outcome measures. These environmental observations are also an important informational source with regard to what to teach and how the characteristics of a system might be altered to better meet conversational needs. In this study, the probability is that many of the communication problems that were observed in the environmental sample would not have been identified in a one-to-one treatment situation (e.g., the fact that most institutional staff members were speaking to the subject from a distance so that board use was difficult; the frequency with which the subject did not respond; the lack of interaction with persons other than direct caregivers). The intervention program for this cognitively normal young adult had five phases with an environmental observation in each: baseline with an alphabet board, observation following the introduction of a modified board (i.e., board stabilized to the chair; addition of words to prevent ambiguity and to increase overall speed), observation after four weeks of using the board, environmental observation following a three-week (ten-hour) communication training program and observation after a single staff in-service. The training program focused on the introduction of topics, handling interruptions, the use of syntactic markers and words for clarity and speed, responding to requests for clarification and increasing the variety of forms for requesting. Staff training centered on interacting with the augmented speaker in a closer proximity so that communication through the language board was possible, asking more open-ended questions and responding to communicative efforts. Changes were observed across system alteration and training phases. These changes took the form of a reduction in the number of no responses, increased initiation on the part of the augmented speaker, a greater number of "Wh" questions and communication at a close range by the staff and an increase in social communication (i.e., conversational devices). At the time of the last environmental sampling, the subject did not use several of the functions and skills that she demonstrated an ability to perform in the therapeutic sessions. Obviously additional training was needed beyond the ten-week program to further increase interactional skills.

The effect of pause time on initiations and multiple communicative functions was examined in an unpublished study by Glennen and Calculator (IP). This training study centered on two children aged 9 and 12 who used Etran-type communication systems. Twenty play objects were used for the study. Ten of those were used for the therapy training sessions, and the children were taught to request them on their own initiation. Generalization probes were used to test the children's ability to spontaneously request trained and untrained items with the therapist and a naive partner. Results indicated that both children initiated a large number of requests for both trained and untrained objects in the delay procedure with both partners. The delay procedure and training in the request function in and of itself did not produce initiations of other language functions in the probe sessions. This may have been due to the salience of requesting and getting action, the vocabulary available, the need for direct training of other functions or the inability of these children to produce other utterances from an environmental rather than a question-elicited context.

This study collaborates with the findings of Light (1985), Weiner and Kornet (UP-1983), Lossing (UP-1981) and Miller and Kraat (UP-1984) that a greater pause time or lack of question-asking by the partner can increase the likelihood of initiations from the augmented speaker. John James (IP) also found attentiveness, interest and reaction to initiation attempts to be a key factor in the frequency of such attempts and initiation development over time. Reduced initiation behaviors have also been related to the lack of novelty in the everyday routines and procedures for many children (Calculator, In press; Turner, 1981; Harris and Vanderheiden, 1980), the high proportion of question- asking that often dominates interaction patterns, or the lack of experience and knowledge about how to initiate when questions are not asked and the stimulus for communication comes from the event or context itself. Several other related causes have been suggested, including the lack of understanding of the power or purpose of other types of communication and a sense of powerlessness or unimportance. Procedures for training of self-initiated communication behaviors in other related populations appear to be applicable to augmented speakers as well (Calculator, In press). Readers are referred to Halle, Baer and Spradlin (1981); Halle, Marshall and Spradin (1979); Halle (1982); Constable (1983); and Calculator (In press).

Jolie (UP-1981) reports on a two-year descriptive study of the development of social and communicative interaction in two children who communicated through vocalization, gestures, a Canon Communicator (alphabet, printout) or alphabet-word board. During training, the therapist interacted with the children using their communication repertoires (e.g., the Canon). Initially the children primarily used linguistic modes to label and answer "Wh" questions. Over the training period, several areas of interaction were specifically addressed including social openings and closings, emotional expression, turn taking, question asking, variation in language use and attention to areas of communicative breakdown (e.g., not noting topic shifts, balancing efficiency and clarity). Over time, positive changes were noted within and outside the treatment sessions.

Several published papers discuss the types of interactive training that may be needed and how these conversational areas might be approached (Mills and Higgins, 1984; Bolton and Dashiell, 1984; Bottoff and DePape, 1982; Yoder and Kraat, 1983; Morris, 1981; Harris and Vanderheiden, 1980; Light, 1984; Shane, Lipschultz and Shane, 1982; Carlson, 1981; Kraat, 1982; Blau, 1983(b); Goosens and Kraat, 1985; Calculator, 1984; Jolie, 1985; Meyers, 1984; Calculator, In press; Cavallaro, 1983; Collier, 1982; Hill, 1984; Harris, 1978). These papers include a variety of conversational strategies, environmental approaches, techniques for developing early intentional use and interaction, some suggestions about modelling and development of a variety of language functions, and the development of specific types of interactions (e.g., peer interactions). Several clinicians and researchers have also developed interaction checklists to assist in observing and identifying areas of communication that are being accomplished easily or with difficulty, or are absent in the observed interactions of particular augmented people and their partners. Several of these unpublished forms are included in Appendix E of this report. Others may be found in the published works of Bolton and Dashiell (1984) and Higgenbotham and Yoder (1982).

The particular vocabulary available to an augmented speaker heavily shapes what can be said, how, and with what efficiency. An augmented speaker may not have a linguistic way to ask a question, to be socially appropriate with a variety of partners, cue a topic change or indicate a communication breakdown. Several participants in the study have noted the need for conceptual models and strategies for selecting appropriate vocabulary and sentence material for augmentative communication devices. This need relates both to vocabulary selection for persons who are non-spellers using restricted vocabulary sets, and the vocabulary and sentences that might be quickly accessed in addition to spelling in other aided speakers. The small range of work in this area to date focuses heavily on beginning users of augmentation (Carlson, 1981; Blau, 1983(b); Fristoe and Lloyd, 1980; Karlan and Lloyd, 1984), and the use of pre-selected vocabularies (e.g., Blissymbolics). Additional vocabulary suggestions for conversational interaction and adult speakers can be found in the work of Bolton and Dashiell (1984); Oaklander (1980); Beukelman, Yorkston, Poblete and Naranjo (1984); Baker (1982); Goosens and Kraat (1985); and Beukelman, Yorkston and Dowden (1985).

During the course of this study, several observations were made about the types and varieties of vocabulary programming that are currently being used. In non-spellers, vocabulary selection is often based on models of language development in able-bodied children (including syntax, semantic referents and relations, and functions), what appears to be the individual's needs and interests (e.g., daily care needs, frequent requests), pre-established vocabularies, and/or a more communicative and interactional approach. With the latter, interactional components are primary. That is, vocabulary or sentences are selected according to the social impact and interaction that can occur. Vocabulary may be selected to assist the aided speaker to gain more conversational control, supplement the user's multi-modal communication efforts, and/or allow for quick participation and feedback in a conversational situation (e.g., continuants, phatic responses). This vocabulary approach may also attempt to provide the user with the greatest communication variety and impact, and a means to handle communication breakdowns and interference, and to project the user's identity and personality. These vocabulary arrays often include conversational openers, ways to assist new listeners, topic or intention indicators (e.g., guess what, question), directives for listener elaboration (e.g., help by guessing some things; here's a hint); and regulators (e.g., I'm not finished; say the sentence word by word and I'll tell you where we are wrong) among others. We need to study the impact of various vocabulary sets and the uses of those sets on the levels of interactions that take place as well as the the social identities they create.

Technology may be at the root of the communication difference in augmented interactions. However, it appears that training or lack of appropriate training and intervention may also be a significant causal factor in many of the poor interactions that we see. What is very much needed is a conceptual framework to direct interaction development and training. In addition, multiple studies are needed to create and validate the strategies and procedures that might be taught to increase conversational levels and opportunities. Our success in those selection and training procedures necessarily needs to be measured and quantified in the social and communicative interactions that are realized in everyday environments.

## CHAPTER VI

## A LOOK TOWARD THE FUTURE

As we have begun to observe and study the communication interactions of augmented speakers in a variety of settings, we have come to realize how far we have yet to go to bring our hopes and dreams to reality. Some augmented speakers have blossomed and are fulfilling many of our mutual expectations for more active communication. However, there appears to be a large percentage of augmented speakers, both children and adults, who are under-utilizing these devices. They are primarily using modes of communication that were available prior to the introduction of a device, and/or interacting minimally in everyday social and communication environments. These realities have led us to attempt to understand why.

Within this report, several possible reasons for the under-utilization of devices and reduced levels of communication that we observed have been identified. Among those have been the types of training provided and the models for that training; the patterns and expectancies of persons interacting with augmented speakers; the accessibility and characteristics of the devices themselves (e.g., vocabulary, output mode); and the lack of attention to social, as well as communication, development.

Our search to understand why some augmented speakers achieve more interaction and communication than others has also led us to an exploration of what communication interaction is, what communication interaction might be when one person is an augmented speaker, and the nature of that unique process. It is hoped that such a direction will give us the models and approaches that we need to achieve greater levels of communication and conversation for a larger number of non-conventional speakers in the future.

Several of our discoveries and interpretations have been shared throughout this report and there have been many suggestions for future clinical and research efforts. A few of the more salient questions that appear to be most critical to our future efforts are briefly outlined and discussed below. This section is based on the author's views at the termination of this study, and follow many thoughtful discussions with participants in this IPCAS project.

### Our Communication Models and Measures

It is appropriate that we re-examine the models that we have been using to direct our observation, training and research in augmentative communication. Currently, the model which is based on normal spoken language use pervades our research methodology, research questions, data interpretation and many of our training goals. This conceptual model has often been applied with little awareness or thought with regard to its appropriateness and utility for augmented-natural speaker interactions. It has greatly shaped our training goals and expectancies for the augmented communicator. I would like to raise several questions with regard to using this normative model in its fullest form, and to offer some alternative directions for the future.

What is the Goal of Intervention and Training? We need to ask ourselves what goal we are working toward in our application of technology and training. Are we trying to create normal, but augmented, speakers and conversational partners? Or do we wish to have the most functional communicators and partners possible within the characteristics and constraints of current technology? On the surface, these questions may appear only to reflect differences in the amount of progress that we can achieve. However, on further examination it is apparent that a functional model may not just be one of reduction, but of difference as well. It is crucial that we discuss and clarify our directives, for these are the foundations of our training models and research efforts.

In exploring our goals and in searching for an appropriate model, one must consider that: (1) The use of a "normal" spoken interaction model implies that we can achieve or soon achieve communication levels equal to speech with augmentative systems. In reality, we are very far from a technological system and system user that can begin to match the rate, flexibility and communication/conversational levels enjoyed by natural speakers.

(2) In our initial studies of augmented interactions, we are observing behaviors that are both reduced and different. The reductions appear in the amount of overall conversation and interaction (e.g., less contribution by the augmented partner, reduced form and content. We are also observing differences in that interaction process. For example, the temporal and non-verbal aspects of turn-taking are altered; the role of the "listener" may be expanded to include co-participation in the production of the augmented speaker's utterances and propositions and in the repair of communication breakdowns; paralinguistic functions are expressed through different forms; able-bodied partners often alter their conventional conversational rules (e.g., become directive, ask multiple questions that require minimal answers and do not share the interaction balance); conventional means for gaining attention are often impossible or non-functional for the augmented speaker; the proxemic relationships in able-bodied interactions are often violated; the natural speaker frequently interrupts and violates coversational rules in an effort to facilitate the interaction. The list goes on.

(3) The capabilities inherent in augmentative devices themselves impact on what is possible, probable and difficult for the augmented speaker to accomplish. For example, the reduced rate in augmentative communication makes it arduous for a user to produce effectively some of the form and content expected of natural speakers in certain social situations (e.g., a lengthy, polite request) or to contribute utterances that are highly time dependent (e.g., comments on ongoing actions, jokes). The lack of speed and natural speech also makes several aspects of discourse structure and regulation difficult

(e.g., taking an optional turn; making a bid for a turn). Restricted vocabularies and reduced rates impact on what can be effectively said in the time allowed, as well as the nature and the amount of topic elaboration that can be achieved. Unique output forms and techniques may restrict intelligibility and *who* can be spoken to, *where* , *when* and *how* . It is likely that some conversational rules, propositions, intentions and social interactions can be achieved easily and in a conventional manner; others can be more easily accomplished through non-linguistic modes (e.g., gesture, non-verbal behaviors) or alterations in the form and content used. Still others may be accomplished in a unique way or may be impossible to achieve at all (e.g., carrying on a lengthy discussion on a difficult topic).

How one views augmentative-natural speech interactions (e.g., interactions can be achieved that match natural speech, are similar to natural speech but quantitatively different, or are quantitatively and qualitatively different) influences intervention and research efforts and directions. For example, if one adheres to the perspective that augmented interactions are similar to natural speech interactions, one would expect an augmented child to initiate topics and optional utterances as frequently as an able-bodied child of the same developmental level. An augmented speaker would be expected to use the same form and content to express the same variety of propositions and functions as a natural speaker does. A "normal" model would also direct the use of limited language space according to grammatical level and those semantic relations expressed by developmentally "normal" speakers, and would view linguistic form as the most appropriate mode of communication. A view of augmentative behaviors as being only delayed or reduced directs intervention toward increasing the number, variety and complexity of behaviors so that they come as close to a natural speaker's ability as possible. In contrast, we would expect to find in an adapted model (e.g., one which views augmentative communication as having some aspects of natural speech exchanges and some differences that are unique to this communication medium) those interaction and communication features that can successfully be achieved given that augmentative communication system. The manner in which they are achieved may be similar or qualitatively different from rules and conventions used in traditional face-to-face interactions.

It appears appropriate and productive to view the interactions between augmented speakers and others from an *adapted and functional model of communicative interaction* rather than from a natural speech model. Given this orientation, intervention is directed toward increasing social and communicative interaction functionally, both through rules used in natural speaker interactions and those that are necessarily and productively adapted to circumvent the constraints of these systems and to optimize interchanges. Such an approach may provide us with an opportunity to maximize current technology, to train the most productive elements of interaction in *this* medium, to address the potential strengths rather than the weaknesses and to creatively explore new ways in which social and communicative interactions might be accomplished.

What Augmented Speakers Can Achieve It has become obvious that the most successful users of augmentative communication systems and their partners cannot achieve communication and conversational levels that natural speakers easily achieve in daily face-to-face interactions. However, we have very little understanding of the actual communicative and interaction levels that can be obtained by augmented speakers and their partners. If we do not know what it is that can be maximally achieved across partners and contexts, or given a variety of communication devices, language levels, verbal and non-verbal repertoires, how can we appropriately adjust our expectation levels? Without this information, it is difficult to know what we are trying to achieve through further technological advances, training and intervention procedures. Clearly, we need to know what is maximally possible for a variety of augmented speakers.

Interestingly enough, participants in this study had little difficulty identifying a variety of augmented speakers and dyads that they viewed as much more successful than others from a propositional, conversational or social perspective. It appears to me that we can gain invaluable information from those augmented speakers and dyads with regard to what is maximally possible, and how it can be accomplished. We need to study them. It would also be fruitful to examine the continuum of communicative interactions that occur among augmented speakers and their partners, and to extract the behaviors and interaction patterns that separate our more successful augmented speakers and partners from those that are less successful.

Such information would help us in some of the following ways: (1) professionals would have obtainable and understandable levels of achievement to direct intervention goals and procedures that are not based on natural speakers' performances, but on the most successful of our augmented speakers; (2) evaluations of performance and progress could be compared with the aided model rather than one based on natural speech; (3) environmental and partner training could be directed towards those interaction patterns that are most successful for both partners in achieving higher levels of augmented communicative interaction rather than natural speaker patterns; (4) the multiple strategies used by both augmented and natural speakers to successfully achieve these levels could be identified and perhaps implemented; and (5) we could move toward better definitions of communication and conversational competency when these terms are applied to an augmented speaker and his or her partner.

The Variables in Augmentative-Natural Speaker Interactions The behaviors observed at any moment in a interaction sequence and across the interaction are influenced by many changing and interrelated factors. These need to be recognized in our search for answers, patterns and profiles, as well as in training. Obviously, many of these variables impact on interactions between natural speakers. Others appear to be unique to augmentative interactions, or appear to impact more forcefully on these exchanges.

The major components brought to a communicative interaction between an augmented and natural speaker (dyad) include: (1) the social/communicative/world knowledge brought to the interaction by both partners; (2) the communication repertoire available to the aided speaker (i.e., verbal, vocal, non-verbal and device characteristics); (3) the verbal and non-verbal behaviors of the natural speaker; (4) the general communicative context (e.g., physical environment, social roles of the partners, usual rules for interaction in this context, attitudes and prior experience between partners); and (5) the adaptive strategies brought to the situation by both partners. A change in any one of these components can markedly change the interaction patterns and behaviors that are observed. For example, a child using augmentation may have a very different interaction with her mother and a stranger in the same setting. Two augmented speakers using the same device may have very different adaptive strategies and therefore interact quite differently with the same able-bodied partner in the same context. Many of these variables have already been discussed in Chapters II & III of this report.

Of particular interest to the continued study of augmentative-natural speech interactions, is the communication repertoire available to the augmented speaker, the adaptive strategies used by both partners, and the social and communicative knowledge of the child or adult using augmentation. In order to understand and evaluate the interactions that are observed, these variables need to be examined singly as well as in combination with other variables. Their collective and interrelated impact on the interaction must be clearly understood.

The aided speaker's performance at any point in the interaction is constrained and shaped by what is available to communicate through. That is, what symbols or words are present to communicate an utterance or intention; what verbal, vocal and non-verbal behaviors are available to supplement or augment this utterance and gain attention; and what non-linguistic material is available in the immediate environment for reference or to faciliate that communication? Any interaction must be carefully evaluated with respect to what is possible for that aided speaker at that particular time. This type of constraint is not found in interactions of natural speakers.

Given a particular situation (e.g., sharing information, signalling a breakdown), the aided speaker must decide how to communicate an intention or proposition with the available repertoire. The "how" represents both what is available and what the aided speaker chooses to use (i.e., communicative strategy). That strategy generally has a technical and communicative component for the aided speaker. That is, he or she must consider not just what is to be said, but how it is to be actualized. The aided speaker makes a decision about the content and form to use (e.g., telegraphic vs full form; available stored words or novel utterances), the mode (e.g., non-verbal; speech vs print), and sometimes the role of the "listener" in that formulation. For example, an aided speaker may gesture to one side of the room and expect the partner to start guessing rather than indicate three related symbols. Obviously some strategies are more effective and efficient than others for a particular situation and partner.

Partners also bring adaptive strategies to the interaction with regard to the communicative and technical aspects of the exchange. For example, a partner may choose the topic and use questioning as a strategy to ensure that the interaction will be successful or efficient. A partner may also decide to guess, predict, ask sub-questions or repeat and summarize to facilitate the communication, or even wait in silence.

Within a specific conversation and context, the interactional behaviors are further influenced by: (1) the topic being discussed; (2) the utterance or listener behaviors that immediately preceed a turn; (3) earlier segments of the discourse; (4) the time allotment given for a turn shift; and (5) the complexity of the utterance or intention desired on the part of the augmented speaker. For example, the augmented speaker may have more productive difficulty asking a question that is not related to the "here and now" immediate environment; talking about a dream versus a current event; or making a request for a partner to keep a secret, versus asking for sugar in his coffee.

The Need For Appropriate Measures of Use As we have become aware of the importance of interaction, the variables involved in that interaction, and the very real constraints placed on an interaction by the limits of our current technology, many of the measures used to define improvement and to measure success in the past no longer seem productive. For example, the number of symbols known to a language board user, the mean length of utterances or the percentage of utterances produced while using the "device". We have learned that these do not necessarily have a relationship to the quality or quantity of interactions in the natural environment.

We have also begun to question whether or not the measures applied to natural speech interactions are the most appropriate or informative measures to apply to interactions that are quite limited and often qualitatively different from these speech exchanges. The language measures of form, content, and discourse and pragmatic use are based on spoken language studies. When applied to natural speech samples, they provide a behavioral description of what natural speakers in a language do, the normative speaker distributions, and the levels of ability in these areas at different developmental and social levels. When applied to disordered or delayed speakers, these measures provide information with regard to how specific pragmatic abilities are altered by the disorder and/or which developmental abilities are currently absent from a child's repertoire. In either case, the information provides a measure of the deficit and directs the intervention toward achieving developmentally appropriate language form, content and use for that speaker.

When normative measures of language use and interaction are applied to augmented speakers, their communication behavior looks deficit in multiple areas of communication performance. For example, given measures such as the number of words spoken per turn or over an interaction, the number of topic initiations, the general class of communicative acts produced, or the structure and sequencing of topic extensions, the augmented speaker obviously has a reduced performance profile. Researchers have often concluded or implied that augmented speakers are deficit in these behaviors. The implication is that professionals need to teach these skills and augmented speakers need to acquire them if they are to be effective communicators. I think we need to question that assumption and our productivity if we follow that model exclusively. Augmentative communication presents a unique challenge. In this type of communicative interaction, an augmented speaker may have the knowledge of the communicative and social rules for a particular context or discourse turn, but may not be able to achieve these spoken forms and conventions easily, readily or at all.

If one takes the position that augmentative interactions are quantitatively and qualitatively different, and that a functional and adaptive model is more appropriate than a normative one, the pragmatic and measurement issues change significantly. This functional-adaptive model leads us toward measures of "effectiveness" rather than mapping characteristics of form, content and use based on normal spoken discourse. The difference is primarily in "how" communication and discourse are accomplished and the levels that can reasonably be obtained. By focusing on effectiveness (e.g., of an interaction, strategy, speaker move), we can also begin to define the levels and pragmatic areas that can be accomplished in this unique type of communication and to identify those that remain a challange.

An Initial Definition of Effectiveness Effectiveness seems to imply that a speaker is able to convey a meaning or intention to another person and that it is understood and affects the partner in the way that the original speaker intended. That intention may be to make a social impression, to contribute to an ongoing discussion, to get someone to give you something that you want, to hurt them, to feel good about yourself, etc.

Obviously, an augmented speaker's effectiveness can vary widely depending on the nature of the communication task presented at any moment in time. A child may not be able to tell his mother the specifics of what happened on the school bus for lack of vocabulary, but can easily make a request for an object in the immediate environment. An adult, through the use of pre-stored sentences, may be able to gain a feeling of belonging to that group and conversation socially, but may not be able to successfully tell a humorous story of any length to the same group to gain a different level of social acceptance. An augmented speaker's effectiveness can also vary widely depending on the communication partner and the setting in which the speaker is trying to convey the intention. For example, a mother may be able to understand an utterance by her non-speaking son through prior shared experiences. That same utterance, conveyed in the same way, may be misunderstood or unintelligible to a person less familiar with him. A child may be able to make a humorous comment via speech synthesis in a quiet environment, but may be ineffective at doing this in a noisy lunchroom.

It seems, then, that in augmentative-natural speech interactions an augmented speaker can be effective for a particular type of utterance or intention, spoken to a particular partner or group of people, in a specific context. One might think of this as "utterance-specific effectiveness". A measure of a person's overall degree of effectiveness might be defined across a continuum of pragmatic tasks (i.e. social, propositional, discourse), across a variety of partners (e.g., of different familiarity, abilities) and across multiple contexts. These measures of effectiveness are based on observable attempts. It may be that we also need to examine "effectiveness" in terms of utterances or intentions that an augmented speaker wants to convey but does not attempt because he or she feels they will not be successful, or those which an able-bodied partner's control of the conversation has precluded. That is, one might look at the effectiveness of what is attempted, the intentions that the augmented speaker wants to convey, and the discrepancy.

One might also look at the effectiveness of an able-bodied partner in communicating ideas and intentions to an augmented speaker. It is doubtful that the speaker would have difficulty conveying propositions and intentions to the augmented speaker. However, the difficulties might surface in the social domain. That is, a person may wish to convey to an augmented speaker that she is interested in him and that she views him as capable and interesting to be with, but may have difficulty translating this to the augmented speaker because of an uneasiness with unconventional modes and how to interact with them.

We often find ourselves talking about the effectiveness of the able-bodied person as a "listener" or partner for the augmented speaker. Less frequently, we address the effectiveness of the augmented speaker as a partner for the natural speaker. In using the term effectiveness here, we are frequently referring to the able-bodied speaker's ability to co-construct an utterance with the augmented communicator, use a particular augmentative technique or provide the freedom for the augmented speaker to contribute more independently and at a different rate. One may convey an utterance or intention successfully through a variety of modes, independently or with the assistance and elaboration of a partner. It appears, then, that we are also sometimes talking about a "dyad effectiveness" for co-constructed utterances.

Our beginning definition focused on the utterance level, that is, the effectiveness of a single utterance or intention shared between two people. Other types of intentions and meanings have a much broader discourse and conversational base. For example, we strive for effectiveness in introducing and then elaborating on a topic; in trying to alter or upgrade a person's opinion or perception of you over the course of several utterances; in developing a bonding or intimate level in a conversation; in training an able-bodied partner to become a better interactant in an augmented situation; and in extending a conversation or signalling closing procedures over a few turns.

Two other aspects of "effectiveness" are also raised here for discussion purposes. How might we measure the degrees of effectiveness for a single utterance and intention, discourse level intentions, and/or dyad effectiveness in co-construction of some utterances and intentions? How might we look at communication attempts that were as effective as possible by a particular augmented speaker given the available strategies, but were not effective enough to convey the intended meaning or to regulate an aspect of discourse?

Given a partner and a context, an augmented speaker must decide how best to convey an intention and utterance with the vocabulary available, the time constraints, the output modes, and the verbal and non-verbal resources. Some strategies are obviously more effective than others at getting the intented reaction or response. Still others may be ineffective and fail. It appears profitable and informative to develop a measure that can differentiate these strategy choices in order to evaluate performance and to gain insights into the pragmatic impact of various augmentative strategies. An initial approach to differentiating the relative effectiveness of communicative and conversational moves may be to look at the efficiency, completeness and clarity aspects of that transfer, or the type of response it evoked from a partner. For example, a bid for a turn may be recognized by a partner but not given; a topic that is introduced may or may not be elaborated by the partner.

It is also often the case that an augmented speaker fails to achieve an intention or exchange of meaning. When this occurs, it is important to know if this is because the augmented speaker has used a poor or ineffective strategy and training is needed, or if the characteristics of the communication device(s) (e.g., vocabulary, addition of an attention-getting buzzer) need to be expanded or altered. To determine this, one must somehow be able to judge whether or not the augmented communicator had another option that would have resulted in effective communication.

Measuring effectiveness certainly appears to be one fruitful way in which augmented speakers, dyads and systems can be evaluated and compared. Other measures need to be developed from many perspectives and combined to evaluate multiple augmentative systems and their varied impacts as well as speakers and their strategies.

An Initial Definition of Efficiency In looking at interaction and negotiation between people, efficiency is not "system" efficiency (e.g., the number of words per minute), but the rate at which meaning is exchanged between the co-participants of that interaction. Again, that meaning or intention can be at the level of an utterance or across larger sections of conversational interaction. This measure is affected by partner strategies and abilities, user strategies, the level and complexity of the intention or utterance being conveyed, and the communication repertoire available to the augmented person for the exchange (e.g., device characteristics such as rate, vocabulary, output modes; non-verbal behaviors; vocalization and verbal abilities; and non-linguistic support available in the environment). A particular proposition and intention may eventually be communicated effectively to the conversational partner. However, this must also be evaluated in conjunction with the efficiency of that exchange. For example, one dyad may attempt to negotiate that proposition with an unproductive series of yes/no questions, poor cueing from the augmented speaker and multiple communication breakdowns. A second dyad may use a yes/no question strategy quite effectively along with a productive choice of symbols or referencing of material in the environment on the part of the augmented speaker, and accomplish the exchange of meaning quickly. Both are effective, but one is more efficient than the other.

In this field, we are unsure whether or not it is appropriate to work toward optimal efficiency in all augmented interactions. Although it initially appears to be a desirable goal because of the extremely slow rates of communication exchange, it needs further evaluation and discussion. It is suggested that more competent augmentative speakers might be those who know when to be "efficiently effective" and when they can or should extend the temporal aspects of communication for another effect. For example, a less efficient utterance and exchange might be used to project "normalcy" through conventional wordings, for first impressions, to convey an intention with greater impact, or to gain greater conversational control.

It is difficult to unravel the multiple intentions that are often present in a segment of interaction. It appears that the use of efficiency may be intertwined in those intentions. For example, in the research of Buzolich (UP-1982), the aided speaker preferred using the voice output device which was a slower form of communication than the alternative, a letterboard. However, that augmented speaker felt more in control. The natural speaker, on the other hand, preferred the alphabet board and ongoing involvement in that interaction. These feelings may have an impact on a listener's probability of interacting with that augmented speaker again, or from the augmented speaker's perspective, in the content of that interaction. The exact relationship of efficiency to the perceptions of augmented speakers and the interaction dynamics need further exploration.

## The Purposes of Communication

Our approach to communication and interaction to date has been heavily weighted toward a language perspective. That is, observing, coding and analyzing interactions between augmented speakers and others from a semantic, syntactic and discourse framework. This has given us valuable information about the types of form and content used in those interactions, a beginning understanding of the types of language intentions that are primarily expressed by augmented speakers and those speaking with them, and an outline of some of the characteristics of discourse structure in this type of exchange. This framework has also identified areas in communication and conversation that do not occur or are infrequently observed, and that are particularly problematic in conversational exchanges between a person using communication technology and others.

Human communication can be viewed from multiple perspectives, a linguistic orientation being only one of those. Communication and interaction take place in social contexts and as such are interwoven with many of the social aspects of relating. This interrelationship not only includes aspects of appropriate language use for specific social situations, but may extend to feelings of self-identity and image, establishing power, gaining a feeling of acceptance and belonging to a group or establishing a feeling of sharing and closeness with someone. These aspects, too, are important to recognize and consider in looking at augmentative communication, communicators, and their communication and conversational interactions.

Throughout this study, it has strongly been suggested that we, as a field, broaden our perspective of communication and interaction to include a wider social and psychological view of that interaction. This seems to be highly appropriate in terms of the low social density profiles that are often reported and the expressed desires of many augmented speakers for increased socialization and social identity. We have often forged ahead in our development of technical aids and intervention programs with a view toward increasing the propositional content and rate available to augmented speakers, as if the provision of substantive information was the only purpose of communication. Several users and participants in this study have suggested that this is but one of our purposes and needs.

Alan Newell has suggested that we should be asking augmented speakers what they most want to achieve through interaction and communication. It is suspected that the answer may have to do with achieving a sense of belonging, of being accepted or of being seen as having an identifiable personality and social worth. Hence, the question that we need to be addressing is how those aspects of interaction can best be achieved. Newell suggests that it may be more important to provide phatic phrases such as those that allow for quick participation in a group, openers and comments that establish personality and identity, or multiple ways to react to a yes/no question. In a global sense, these aspects of communication may be at least equal to, or more important to address than, our current heavy emphasis on other aspects of communication and technological development.

## Some Research Directions

Research has only recently begun in the area of communicative interaction in augmented conversations. To date, five studies have been published that specifically address interaction patterns in this type of communicative exchange. This IPCAS study has collected several other unpublished and ongoing research studies and observations to give us a broader basis from which to draw for future research. This study has also begun to outline the components and variables in that interaction process to broaden the scope of future research and clinical efforts.

A great many areas remain to be studied and understood. We urgently need more information in all areas of communicative interaction that involve augmented speakers. The investigative process needs to address multiple levels of analysis -- global, macro and micro -- in single case studies and across a wide variety of aided speakers and dyads. The information may be descriptive, observational or empirically derived. It can emanate from researchers, clinicians, teachers, users or conversational partners. Of importance is the detail of that description and the observer's awareness of the variables and multi-modal behaviors involved in that process.

Several areas for study have been outlined and/or discussed in earlier sections of this report. A few that seem particularly important and productive to our understanding of this process are briefly reviewed here:

1. Studies outlining the behaviors of our more successful users and partners.

We need to understand the behaviors and strategies, used by both partners in communication exchanges, that appear to be successful from a social, conversational or propositional perspective. In doing so, we need to factor out the behaviors that lead us to make these judgments with a variety of people using muliple levels of augmentation and technology. Those speakers and dyads judged as "successful" or "good" also need to be compared with our less successful users so that we can begin to understand the differences. We also need to understand the levels of interaction and communication that can be attained by our more successful users within the constraints of their communication systems. This area of research has been discussed earlier in this chapter.

2. Studies regarding how various aspects of meaning and conversation are negotiated.

We presently know very little about how various meanings are successfully exchanged in augmented interactions. For example, how do augmented speakers using a restricted vocabulary (e.g., 50-symbol board with x language characteristics) and available non-verbal/verbal abilities accomplish a variety of propositional utterances, multiple intentions or topic introductions? And how do they accomplish this in negotiation with a range of partners and contexts or with one specific

partner? How might persons using an alphabet board regulate aspects of a conversational structure (e.g., recover from an interruption; successfully open a conversation with a stranger)?
These investigations may benefit from the descriptive methodologies used in behavioral studies in social interaction, cross-cultural studies, ethnography, sociolinguistics or anthropology (Saville-Troike, 1982; van Kleeck, 1985).

3. Studies regarding the differential effect of vocabulary/symbol sets and device characteristics on the interaction process.

Aided speakers are interacting or attempting to interact with others through the use of very different augmentative systems. We need to gain an understanding of how various vocabulary sets, symbol forms, sets of pre-stored sentences and output modes shape the communication possibilities differently. Obviously interaction patterns are also influenced by how and when the aided speaker chooses to use what is available, and the interactive and reactive behaviors of the natural speaker. However, what is possible given a particular communication problem is, in many ways, predetermined by the characteristics of the system available to the aided speaker.

We have minimal understanding of what types of vocabulary and sentences to be programming or adding to the available repertoire in our current devices both for persons with and without spelling capabilities. Numerous observations by professionals indicate that a change in vocabulary may be beneficial to an interaction (e.g., to provide greater topic or referent cues; to signal and repair conversational breakdowns; to increase the probability or frequency of interactions; to hold and to claim a turn; or to provide conversational openers). This is a difficult area to study from a methodological standpoint. However, it might be approached by studying able-bodied speakers and then augmented speakers at various developmental levels using specific vocabulary or sentence sets to accomplish a variety of tasks or to interact in everyday situations. One might also be able to document changes in interaction patterns, effectiveness or efficiency, or the ability to solve particular communication problems with an augmented speaker as alterations in vocabulary are made.

Most of our studies to date have centered on persons using alphabet or language boards through a direct selection technique. We have yet to understand the impact of various types of augmentative communication devices, and how their characteristics affect interaction patterns and possibilities. Of particular interest is the effect of independent and dependent aids of various types (i.e., electronic versus non-electronic), scanning versus direct selection techniques, various output modes (e.g., print versus speech; type of screen), rates of communication, types and intelligibility of synthetic speech, and the overall appearance of the device. This information would be invaluable to device developers and in prescription and intervention planning.

4. Studies regarding the effects of various training models and methodologies on the quality and levels of communication and social interaction achieved.

During the course of this study, it has become very clear that: (1) The provision of a communication device does not automatically result in increased communication and conversational skills and interactions. This is true for both augmented speakers with developmental disabilities and those with acquired neuromuscular disabilities; (2) Training that primarily addresses symbol identification, labelling and accessing techniques appears to be insufficient to make an impact on communicative interactions in everyday situations; (3) Training that focuses on vocabulary acquisition and syntactical and grammatical form does not necessarily translate into using this information in everyday communication situations.

The conversational and communication problems faced by augmented speakers in everyday situations require a knowledge of how to use an augmentative repertoire to interact, solve and accomplish communication tasks. We are beginning to realize that this encompasses knowing how to use a non-conventional and restrictive system in a variety of situations and with partners who differ widely in their abilities and shared knowledge. We have also gained an understanding of the importance of involving primary partners in the environment in that training, and developing their skills in interacting with augmented speakers and systems.

We are currently attempting to understand just what we should be training augmented speakers and partners at various levels of augmentation and development to do. We are also investigating how that knowledge and use might effectively be trained. This IPCAS project has been an initial step in understanding and directing those efforts. Those training models and goals should most appropriately evolve from a greater understanding of augmentative communication as a process, and the many variables, problems and differences involved in this unique type of interaction.

In creating new methodologies and in developing innovative training procedures, it is essential to document and describe the effects of many different programs. These may be single case or multiple case studies dealing with one aspect of behavior (e.g., providing feedback, taking turn opportunities), or multiple levels of behavioral change. Of importance is documenting changes in behaviors or attitudes that reflect a meaningful change in interactions outside a clinical training session or communication sample. This mandates that we periodically observe in natural environments to obtain baseline observations and to document changes. Methodologies are also needed for the collection of in-clinic observations that are representative and valid measures of the interaction problems and behaviors that occur in naturalistic contexts.

In the future, a state of the art report on training in augmentative-natural speech interactions would be an extremely worthwhile extension of this report.

5. Studies that provide us with greater understanding of the shaping of attitudes and their effect on interaction.

This area has had minimal investigation to date. We need to develop an understanding of what those attitudes are, and how they are translated into interaction behaviors and expectancies. Of primary importance seems to be how to alter inappropriate perceptions of augmented speakers and systems. This might be done through language, non-verbal behaviors, appearance, device characteristics and the conversational moves and behaviors of an aided speaker.

6. Studies regarding the social and communication knowledge of aided speakers with developmental disabilities, and the relationship of that knowledge to performance.

It has often been assumed that aided speakers possess the tacit language and social knowledge needed to communicate and interact in a variety of social situations, but have difficulty expressing that knowledge because of restrictive communication systems or the effort and time required. The recent work of Sutton (UP-1984), Blackstone and Cassatt (UP-1983) and Light (1985) have raised questions about that assumption. Given extended time, an elicitation context and an ideal listener, the adolescents and children studied were able to produce a greater variety of communicative acts, and to shift content and form for different social partners. However, not all of these aided speakers were able to perform all the tasks. We need to examine the knowledge that developmentally disabled speakers possess with regard to a variety of communication and social rules. The discrepancies between optimal and average performance also need to be examined more closely. The findings of these studies have many implications for language and communication training.

7. Studies with regard to cross-cultural differences in interaction between aided and natural speakers.

Many of the interaction studies have been done in the United States. The applicability and relationship of findings obtained in one culture or sub-culture to another is not presently known. The impact of various design features, synthetic speech, slow rates of communication, long pause times, altered non-verbal behaviors and expectations may be very different. We need to know some of these differences in order to understand the applicability of research findings across cultures.

9. Studies with regard to interactions between two aided speakers, augmented speakers in group contexts and peers/siblings.

This IPCAS study has focused on interactions between two people (dyad) when one of those participants is using augmentation. Aside from the initial work of Jolie (UP-1981) and the individual training efforts and observations made by a few teachers and clinicians, we have little information about peer interactions, group interactions and communication between aided speakers themselves. These are important aspects of interaction and communication which must be addressed in future research.

## A Final Comment

The continued study of communicative interactions between persons using augmentative communication systems and others undoubtedly holds many of the keys that would enable persons with severe speech disabilities to obtain higher levels of communicative and social interaction. We have become aware of the large discrepancies between what is trained and observed in teaching and laboratory settings, and the behaviors and conversational challenges that occur in natural settings. We have also begun to realize that through adaptive strategies and special training the augmented speaker can achieve a great deal in social and communicative situations. In the past we have all too often focused on advances in technology to bring the non-speaker into the communication and conversational arena, and to increase the levels of communication and interaction possible. We are now beginning to understand that creating technology with faster rates, larger vocabulary storages and more intelligible synthesis is incomplete and, in and of itself, does not necessarily make an impact on the lives and communication statuses of non-speakers. We need to learn how to use this technology effectively. Hopefully, with the further study of the nature and process of communicative interaction, and the effect of various device characteristics and adaptive communication strategies on that process, we will be closer to actualizing the potentials of technology and to bringing more effective communication to non-speaking children and adults.

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# APPENDIX

## COMMUNICATION INTERACTION BETWEEN AIDED AND NATURAL SPEAKERS

## APPENDIX UPDATE

Unpublished and in-progress studies in these Appendixes include clinical and research efforts shared with the IPCAS Project as of September 1984. Since that time, the in-progress studies of Light (IP); James (IP); Farrier, Yorkston, Beukelman and Marriner (IP); and Kraat and Levinson (IP) have been completed. To date, manuscripts have been submitted for publication by both Light and Farrier et al. At the time of the final submission of this report, only one of the unpublished studies found in this appendix has reached publication. That is the study of Fishman, Timler and Yoder (Augmentative and Alternative Communication , 1 (1), 1985).

As the interest in interaction in augmentative communication continues to grow, several new research and clinical studies continue to be identified in the participating countries. Two research studies have begun in British Columbia under the direction of Carolyn Johnson at the University of British Columbia in Vancouver. A research project in clinical training of interaction is underway at the Augmentative Communication Service at Ontario Crippled Children's Centre (now the Hugh MacMillan Medical Centre) in Toronto under Janice Light. A research project on interaction in severely mentally retarded persons is currently in progress in Sweden with Gerd Anden as the principal investigator. G. Le Cardinal and J. Guyonnet, Universite de Technologie de Compiegne, France have begun to develop a model for interaction as it relates to communication and augmentation. Dissertation studies are in progress with Lucinda Cassatt, University of Maryland, and Jeffery Higginbotham, Western Michigan University (USA). Delva Culp is continuing to address the clinical intervention needs of augmentative speakers through studies at Callier Center, Dallas, Texas. The University of Pittsburgh, (USA) under the direction of Donald Egolf, is currently studying aspects of interaction in augmented speakers through a research grant. Jeanne Wilcox, at Kent State University (USA) is investigating the early interaction patterns of severely handicapped young children. In addition, research efforts continue the area of technology and interaction at the University of Wisconsin - Madison, under the direction of David Yoder; Queens College, under Arlene Kraat; and at Children's Hospital, Boston, under Howard Shane.

It is probable that there are research and clinical activities directed toward interaction in augmentative communicators that have not been identified during this state of the art study. However, a concerted effort has been made to bring as many of those studies as possible from England, Sweden, Canada and the United States to our common knowledge through this IPCAS research effort.

3/85

PLEASE NOTE: In the following pages, the notation (AWK) indicates that the information has been abstracted by Arlene Kraat, not the principal investigator

# APPENDIX A

## UNPUBLISHED RESEARCH STUDIES (UP)

Andrews, N. *The use of Blissymbolics in a special school,* Unpublished master's thesis, University of London, 1980.

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## UNPUBLISHED RESEARCH STUDIES UP

### IPCAS Study on Interaction

**Title of Research Study:** The Use of Blissymbolics in a Special School

**Principal Investigator(s):**

Nirmala Andrews (Under the direction of Chris Kiernan)

**Type of Research Project:** (Dissertation, Thesis, Independent Study, Funded)

Master's Dissertation, University of London Institute of Education

**Date Completed:** September, 1980

1. **Purpose(s) of the Research:** This research project examined the interaction between a group of six physically disabled children using Blissymbolics and adults in two environments, the classroom and speech therapy sessions in an effort to answer the following questions: (1) Is effective communication taking place; (2) Does usage depend on situational constraints; and (3) Does usage correlate with intellectual ability as measured on the Columbia Mental Maturity Scale and the English Picture Vocabulary Test?

II. **Project Description:**

The children studied were between the ages of 3 years, 11 months and 7 years, 8 months. Three of these children were totally dependent and used eye-pointing to indicate symbols; the three others were more physically able and used direct selection to indicate symbols on a display. All had used Blissymbolics for at least 6 months. The number of symbols available on language boards varied across subjects (i.e., 20, 80, 88, 120, 120, and 160 symbols).

Communication usage was sampled in three classroom contexts, an academic lesson, lunch, and a craft activity. Each context was sampled three times for a half-hour period. Usage was also sampled during speech therapy again for three sessions of one half hour each. The children's symbol use and non-verbal behavior was recorded; the adult's verbal behavior was also recorded.

A semantic, syntactic and pragmatic analysis of the communication samples was made. The syntactical analysis examined the symbol use in terms of parts of "speech"; the semantic analysis used an adapted version of the ELIS (Environmental Language Interest Strategy) by McDonald and Blott, 1974; the pragmatic analysis used a modified version of Dore's illocutionary types (1976) and was applied to both symbol use and non-verbal behaviors. The non-verbal behaviors were classified according to the categories outlined by Kiernan (1979) which included declaratives, imperatives, and social forms. The adult utterances were modeled after Mittler (1976) and included general function utterances (e.g., statements of control, encouragement, running commentary, and extention of play via language); and question types (e.g., those used for labeling of nouns and verbs,

## II. Project Description (Continued)

two-choice questions, open ended forms, facilitatory, rhetorical and maintenance questions).

## III. Major Findings/Results:

Some of the major findings were: (1) Symbol use was greater in the therapy situation than in the classroom; non-verbal behaviros were more frequent in the classroom than in the therapy situation; (2) Within the classroom contexts, symbol use was greatest during the academic time; (3) Non-verbal behaviors were highest for the imperative function in the classroom and the declarative function in the speech treatment session; (4) There was a wider use of semantic functions in the therapy situation, but little use of topic introduction; classroom use was high in agreement and negation functions which do not requere symbol use, and included more topic initiation on the part of the symbol users; (5) Two-choice questions were used by adults in both situations, with therapy also including a high number of open-ended question forms; (6) The psychological tests used did not correlate with the frequency of symbol usage.

The study concludes that there are very different communication demands of each setting, and what is expected of the non-speaker in a therapy session may non be particularly representative of the demands of the classroom or the resulting communicative styles of the nonspeakers. The style adopted by adults appears to effect the amount, range, and type of communication used by the symbol users.

(AWK)

## IV. Written Manuscript/Summary Available From:

☐ Yes ☒ No

## UNPUBLISHED RESEARCH STUDIES UP

### IPCAS Study on Interaction

**Title of Research Study:**

Interactional Strategies With and Without An Augmentative Communication Device: A Case Study

**Principal Investigator(s):**

Patricia Bailey and Howard Shane
Children's Hospital Medical Center
300 Longwood Avenue
Boston, MA 02115
(617) 735-6466

**Type of Research Project:** (Dissertation, Thesis, Independent Study, Funded)

Master's Project in Communication Disorders
Emerson College

**Date Completed:**

June, 1983

### I. Purpose(s) of the Research:

This study compares the interaction strategies of a nonspeaking adolescent and familiar persons in two different environments (at home with his family, and in school) using structured and unstructured communication situations and an interview. These interactions are analyzed in relation to their effectiveness, efficiency, and the conversational modes and strategies used.

### II. Project Description:

The nonspeaker studied was a developmentally disabled boy of 13 years of age. Communication means available to him were eye gaze, gross gestures, hand movement, and inconsistent vocalization, along with a two number coding of words and phrases, and an Etran alphabet system used as a back-up. Receptive language scores were reported at the 7 year level.

The structured communication context consisted of a description (3 details) of one of three pictures by the nonspeaker. The mother or the teacher attempted to identify the picture indicated in two tasks. The unstructured interaction context consisted of a free conversation/interaction in the classroom or with his family. Thirty minutes of interaction were videotaped; two 3 minute segments were selected as typical of each ½ hour interaction and were analyzed. Interviews were conducted with the mother and teachers aide regarding interaction with the nonspeaker. Questions were directed at the method of interaction, functions, expediency strategies, selected discourse features, breakdowns, and attitudes toward various modes of communication.

Coding categories were based on observed patterns that emerged. These included various modes of communication used by the nonspeaker (specific board used, eye contact, affective status, vocalization, and cue for shared information). Several coding strategies were used to describe the adult behavior in the dyads. These included types of responses to board use, predictions used, clarification form asked for/used, acknowledgement of

II. Project Description (Continued)

breakdown, and use of a third person as interpreter. These behaviors were tabulated for frequency of occurrence, and percentage of over-all use. Predictions were further examined for type and acknowledgement by the non-speaker.

III. Major Findings/Results:

The nonspeaker's use of communication modes and the frequency of mode use were different in interactions with the mother and the school aide on both the free and unstructured contexts. Use of the communication board was observed only in the school setting; in both situations body gestures and vocalization were used with greatest frequency than other modes. The non-speaker used different frequencies of mode use in the two communication situations (e.g., in the home, greater use of speech over gesture was observed; in the picture context, gestural use was more frequent than speech use). This was true of interactions with both the mother and the teacher. Interview statements were not borne out in observation suggesting that the adult interactants were not highly aware of the modes that were being used for communication exchange.

The adult partners varied in their use of communication strategies and the successfulness of those styles. Some of these findings include: minimal use of prediction by the mother and a greater variety of strategies used by the teacher's aide. In terms of effectiveness, the mother was unsuccessful in identification in the picture task; the teacher's aide was successful. The user was generally more passive with the mother than with the teacher, and frequently tended not to acknowledge predictions, even when incorrect. (AWK)

IV. Written Manuscript/Summary Available ☒ Yes ☐ No

From:

Howard Shane, Ph.D.
Speech Pathology and Audiology
Children's Hospital Medical Center
300 Longwood Avenue
Boston, MA 02115

## UNPUBLISHED RESEARCH STUDIES UP

### IPCAS Study on Interaction

**Title of Research Study:** Evaluation of Communication Board Use in a Residential Setting

**Principal Investigator(s):** Cheryl A. Buettemeier

**Type of Research Project:** (Dissertation, Thesis, Independent Study, Funded)

Master's Thesis, Communication Disorders, University of Wisconsin under the direction of David E. Yoder, Madison, Wisconsin

**Date Completed:** September 26, 1983

I. **Purpose(s) of the Research:** The main purpose of this investigation was to provide a functional description of the communicative interactions between non-speaking individuals and both the staff at a residential facility and their public school teachers. Some of the questions to be investigated included: mode of subject message (board vs. non-board), speaker role (initiator vs. respondent), non-verbal communicative behaviors and communicative events.

The secondary purpose was to evaluate the role of communication systems on both the living unit of a residential facility and in a public school classroom setting, and to provide updated information on the current augmentative communication systems being used by the subjects.

II. **Project Description:**

Subjects: Five non-speaking, mentally retarded residents from Central Wisconsin Center for the Developmentally Disabled (CWC) participated in this study. All subjects had previously participated in studies involving training in the use of Blissymbols and the assessment of their use of Blissymbols as an augmentative communication system.

Procedures: All five subjects were observed while on the living unit of the residential facility. In addition, two of the subjects were also observed while at school. The subjects were observed until data had been collected for ten residential interactions per subject and five school interactions per subject.

The on-line coding system developed for this study was based in part on those coding systems referred to by Calculator and Dollaghan (1982), Yoder and Riechle (1977) and Higginbotham and Yoder (1982). Major variables investigated in this study included the following: mode of subject message (board vs. non-board), speaker role (initiator vs. respondent), outcome of subject message, success of subject message, communicative events, kinesic system, paralinguistic system, proxemic system and length of interaction. All interactions were coded simultaneously by the experimenter and another graduate student. The first interaction occurring after every five minute block of time was coded until all desired interactions were coded.

Prior to the actual data collection, both observers practiced coding from videotapes until inter-observer reliability was established. Inter- and intra-observer reliability over time was determined by having both observers code three interactions (from videotapes), on two separate occasions, two weeks apart.

## II. Project Description (Continued)

For the on-line data collection, a confidence rating scale of 1 to 3 was used. A rating of "1" indicated a very low level of confidence and a rating of "2" indicated a moderate level of conficence. Coded interactions resulting in a confidence rating of "3" were omitted from the final sixty interactions analyzed. Interactions given ratings of "1" or "2" were included if both observers agreed on the coding of all items.

After all interactions had been coded, persons interacting most frequently with each of the subjects were asked to respond to a survey regarding the subjects' use of his/her communication board.

In order to provide current information on the five subjects, their previous communication systems (from previous studies in 1975 and 1977) and their current communication systems were described.

## III. Major Findings/Results:

Results of the on-line coding revealed that all subjects in both the residential and school settings used the non-board mode far more frequently than the board mode for all communicative interactions.

Of all the 50 residential interactions analyzed, 25 (50%) were initiated by the subjects, indicating that overall, the non-speaking subjects initiated communicative interactions just as frequently as they responded to others' initiations. In contrast, only three of the ten schools interactions (30%) were initiated by the subjects.

Concerning the use of non-verbal communicative behaviors, all subjects used regulators, however, there was only limited use of other types of kinesic behaviors such as emblems. In addition, most of the subjects exhibited only very limited volitional use of paralinguistic behaviors.

The majority of the subject's communications were limited to such communicative events as "giving information" and "getting an interactant to do something."

The response to the survey concerning the subjects' use of his/her communication board confirmed most all of the findings of the on-line coding.

Though all subjects were provided with and trained in the use of their communication boards, these augmentative communication systems were rarely used in either the school or residential setting. In fact, most of the subjects were communicating through the same modes that they were initially using prior to their introduction to an augmentative communication system.

## IV. Written Manuscript/Summary Available ☒ Yes ☐ No

**From:**

Cheryl A. Buettemeier
3610 147th Place, NE B-14
Bellevue, WA 98007

## UNPUBLISHED RESEARCH STUDIES

### IPCAS Study on Interaction

**Title of Research Study:**

Interaction Analyses of Adult Augmented Communicators: A Pilot Study

**Principal Investigator(s):**

Marilyn Jean Buzolich, Ph.D.
294 Carl #16
SanFrancisco, CA 94117

**Type of Research Project:** (Dissertation, Thesis, Independent Study, Funded)

Pilot Study for Dissertation at University of California at San Francisco

**Date Completed:** June, 1982

1. **Purpose(s) of the Research:** The purpose of this pilot study was to explore a new methodology for assessing communicative behavior of augmented communicators interacting with normals. The emphasis of this study was on the dyad, observing and assessing the communicative behavior of each interactant. Two different research strategies were employed: a micro and a macroanalysis. The microanalysis was employed for the purposes of developing a taxonomy to describe communicative behavior of an adult using two different augmentative communication systems to interact with an unfamiliar normal adult. The macroanalysis was employed for the purpose of generating a reliable clinical measure for evaluating this communicative behavior.

II. **Project Description:**

Two subjects were selected for the pilot study; one adult male with oral speech dysfunction associated with cerebral palsy and one adult female with normal verbal speech. Subjects were matched with respect to approximate educational level. The speech handicapped subject was a multi-communicaton aid user. He used the Handi-Voice 120, a voice-output communication device, an alphabet-speller (communication board) and a home computer for written text. The normal subject had no previous experience with severely physically handicapped individuals using augmentative communication systems.

The subjects were videotaped in the augmented communicator's home for 20 minutes while engaging in conversational interaction. During the first 10 minutes the augmented communicator used his alphabet speller while in the last 10 minutes he used his Handi-Voice 120 while interacting with his conversational partner.

Microanalysis (Clinical Research Profile)

The 20-minute videotaped sample was transcribed according to Ochs's (1979) transcription method. Nonverbal and verbal behaviors were recorded sequentially across interactants. Three minute samples of each interaction were recorded by another observer for reliability purposes. The transcribed conversational samples were analyzed with respect to turn-taking, contingent queries/repair, interruptions and overlap, and topic, and compared to normal models proposed by Duncan and Fiske (1977), Corsaro (1979), and Mishler (1975).

## II. Project Description (Continued)

Macroanalysis (Social Validation Profile)

An observational protocol for adult pragmatic behaviors as it applied to augmented communicators was constructed. Two speech/language pathologists were trained in pragmatic analysis and then completed the questionnaire after viewing each conversational sample two times.

A questionnaire for aided (augmented) and unaided (normal) communicators was administered. Both members of the dyad completed questionnaires and made comparative judgements about the systems of communication used.

## III. Major Findings/Results:

The clinical research profile (microanalysis) revealed differences in the pattern of interaction displayed when the augmented communicator used the alphabet speller and the Handi-Voice 120. Some of the differences can be attributed to the system of communication used, and some to the nature of this unique interaction.

Socially conventional signals for turn regulation were utilized in this interaction between augmented and normal communicators but the cues comprising these signals differed from that proposed by Duncan and Fiske (1977) and persisted across systems of communication used.

Requests for revision of an unclear message by the normal speaker and repairs by the augmented communicator only occurred during the alphabet speller condition, suggesting that the Handi-Voice was superior in terms of message intelligibility.

The number of interruptions and overlap across conditions did not differ significantly; however, the normal speaker was responsible for the majority of interruptions resulting in overlap.

Topic was primarily controlled by the normal speaker under both conditions, particularly when the augmented communicator used his Handi-Voice.

The social validation profile (macroanalysis) was unsuccessful at generating a reliable clinical measure for interaction analysis of augmented normal speaker conversation.

Major Findings/Results (Continued)

In a subsequent study the observational protocol should be organized so that each communicative behavior is grouped with the complex multi-channel cues that signal the behavior. The observer could judge both members of the dyad to determine whether communicative breakdowns were due to the absence of signal display or to the failure of the partner to respond appropriately to the signal.

Clinicians completing observational protocols should view a training tape prior to judging conversation samples.

Interactants' judgements on the questionnaires were valuable measures on the social validation profile. Responses on the questionnaire identified parameters which were meaningful to the participants; that of rate, intelligibility, and role relationships. Rate and intelligibility are components characteristic of the efficiency of a communication system (Beukelman and Yorkston, 1982) whereas role relationships between speakers reflect dimensions of power and authority in social interaction (Mishler, 1975; Corsaro, 1979). Replication of the study will enable us to determine whether external factors of system efficiency and internal factors of speaker's perception of role relationships interact to affect conversational patterns between adult augmented communicators and normal speakers.

IV. Written Manuscript/Summary Available ☐ Yes ☒ No
From:

## UNPUBLISHED RESEARCH STUDIES UP

### IPCAS Study on Interaction

**Title of Research Study:**

Interaction Analysis of Augmented and Normal Adult Communicators

**Principal Investigator(s):**

Marilyn Jean Buzolich, Ph.D.
294 Carl #16
San Francisco, CA 94117

**Type of Research Project:** (Dissertation, Thesis, Independent Study, Funded)

Doctoral Dissertation, University of California, San Francisco, CA

**Date Completed:** November, 1983

**I. Purpose(s) of the Research:**

The primary purpose of this study was the development of methodologies for measuring communicative behaviors of augmentated communicators in an interactional framework. A second purpose was to explore various aspects of discourse management in an attempt to describe the form and function of interactive behaviors between augmented and normal communicators.

**II. Project Description:**

Four male subjects participated in this study; two adults with oral speech dysfunction associated with cerebral palsy and two adults with normal verbal speech. Eight 20-minute videotaped samples of conversational interaction were collected from the subjects. Augmented communicators used a communication board (alphabet speller) and a Handi-Voice 120, each for 20 minutes to communicate with each of the conversational partners. Two videotaped segments were selected from each of the eight 20-minute samples for transcription and analysis. The total analysis segment for each sample was 20 turn exchanges; 10 speaking turns by each member of the dyad. One segment was selected from the first half of the sample and one from the second half. The analysis segments for each sample were transcribed according to a modified version of the notation system devised by Ochs (1979). (See Appendix.)

Two different research methodologies were used to describe interactive patterns between augmented and normal communicators. For the microanalysis, conversational samples of dyadic interaction between augmented and normal speakers were analyzed with respect to five different aspects of communicative behavior; 1) turn-taking; 2) rate; 3) contingent queries and repair; 4) interruptions and overlap; and, 5) topic maintenance. Procedures to establish reliability were used for the transcription, coding, and analysis of data. The macroanalysis involved

## II. Project Description (Continued)

comparative and absolute judgements by the interactants and by 32 naive observers of communicative competence and communication system effectiveness. Interactants completed questionnaires regarding communicative competence and proficiency in system use. Observers viewed the eight edited conversational samples and completed two questionnaires for each dyad (See Appendix). Results were compared within and between dyads to determine whether those interactions consistently judged more effective were related to the type of communication system used, the particular system user, conversational partner, or some interaction of these variables.

## III. Major Findings/Results:

### MICROANALYSIS

Augmented-normal interaction was managed by the normal speaker who maintained control in turn regulation, turn size, and topic. Patterns of interaction were also affected by the system of communication used.

### Turn Regulation

Normals experience an extra-ordinary ability to claim turns during interaction with augmented communicators while augmented communicators are often unsuccessful. Unsuccessful attempts to claim turns by augmented communicators were due to delays in initiation of message delivery. There was a greater delay in message delivery with the Handi-Voice 120 as compared to the alphabet speller.

### Rate

Normal speakers dominated over the augmented communicator with respect to the amount of information per turn.

### Contingent Queries and Repair

Handi-Voice 120 had positive effects on augmented-normal interaction with respect to decreasing the number of technical breakdowns.

### Interruptions and Overlap

Handi-Voice 120 provided a means with which the augmented communicator could interrupt his normal conversational partner.

## Major Findings/Results (Continued)

### Topic Maintenance

The respondent pattern of augmented communicators was most prevalent during the early part of the conversation but as the conversation continued, augmented communicators contributed more information and the difference between augmented and normal speakers diminished.

### MACROANALYSIS

The macroanalysis revealed individual differences between augmented communicators with respect to communicative competence and proficiency in system use while there were no overall differences in normal speaker skill for the conversational partners. Conversational control for augmented communicators was related to communicative competence and proficiency in system use.

Using micro and macroanalytic approaches simultaneously is a valid approach in augmented-normal interaction research. The macroanalysis provided a means with which to socially validate results obtained on the microanalysis.

The present study has implications for design and development of communication devices as well as intervention approaches. The major inpetus in communication system design is increasing the speed of communication. The results of this study also emphasize the importance of this goal. The present study also revealed that greater system use proficiency was correlated with more normal profiles on all the measures studied. Training must occur within an interactional framework. The form of training with regard to the technical aspects of conversational management should be increasing speed of communication, intelligibility, and strategies for achieving greater conversational control.

IV. Written Manuscript/Summary Available ☐ Yes ☒ No
From: (publication and preparation)

**UNPUBLISHED RESEARCH STUDIES** **UP**

**IPCAS Study on Interaction**

**Title of Research Study:** Design and Revision of Non-Oral Systems of Communication for the Mentally Retarded/Physically Handicapped: A Discussion of the Uni-Color Binary Visual Encoding Board With General Implications for Communication Board Training - Working Paper #101

**Principal Investigator(s):**

Stephen N. Calculator, Ph.D., Department of Communication Disorders
University of New Hampshire, Durham, N.H. 03824
Tele. (603) 862-2110

**Type of Research Project:** **(Dissertation, Thesis, Independent Study, Funded)**

Independent Study

**Date Completed:** October, 1977

**I. Purpose(s) of the Research:**

a. To provide an introduction to the field of augmentative communication and an overview of assessment/treatment considerations for working with nonspeaking persons.

b. To demonstrate the need to individualize communication aids to meet the specific needs of the nonspeaker. The evolution of the UCBUEB, a device necessitated by one client's inabilities to master an ETRAN display, is detailed. This system requires the client to match colors, in sequence, in order to visually convey a choice of any one of 64 items depicted on her communication board.

**II. Project Description:**

This paper begins by attempting to identify "the nonspeaker", reviewing previous terminology which has been applied to such persons. The author then presents an overview of communication boards, describing alternative methods of signaling and displaying content.

Following this introductory material, the evolution and implementation of an eye encoding system is traced from the perspective of its user's specific needs and abilities. Various factors commonly associated with nonspeakers' failures to communicate effectively (e.g., inadequate staff training) are examined in conjunction with the corresponding assessment and treatment measures they should engender.

## UNPUBLISHED RESEARCH UP

## II. Project Description (Continued)

## III. Major Findings/Results:

Clinically, this study demonstrates a series of program steps which resulted in the successful introduction of an eye gaze communication board for one non-speaking adult. The author stresses the need to cater the content of assessment and training to the client's specific disabilities and strengths. The training sequence he presents is thus one which must be revised in each subsequent application of the UCBUEB.

## IV. Written Manuscript/Summary Available ☒ Yes ☐ No

**From:**

Stephen N. Calculator
Dept. of Communication Disorders
Paul Creative Arts Center
University of New Hampshire
Durham, NH 03824

## UNPUBLISHED RESEARCH STUDIES UP

### IPCAS Study on Interaction

**Title of Research Study:** Comparison of Speaking and Nonspeaking Mentally Retarded Adults' Methods of Responding to Listeners' Requests for Clarification

**Principal Investigator(s):** Stephen N. Calculator, Ph.D., Department of Communication Disorders, University of New Hampshire, Durham, NH (603) 862-2110

and

Dianne Delaney, M.S., Pennsylvania State University, University Park, Pa. 16802 (814) 865-5414

**Type of Research Project:** **(Dissertation, Thesis, Independent Study, Funded)**

Independent Study and Thesis, Penn State University

**Date Completed:** February, 1984

### I. Purpose(s) of the Research:

1. To examine how nonspeaking mentally retarded adults using communication boards as their primary mode of expression respond to a conversational participant's requests for clarification.
2. To compare the above results to those obtained from a matched (linguistically and cognitively) group of speaking mentally retarded adults.

### II. Project Description:

Ten residents (5 nonspeaking and 5 speaking) from a facility housing mentally retarded/physically handicapped persons participated in this study. Nonspeakers were currently using direct selection communication boards consisting of between 191 and 229 symbols. Production MLUs ranged between 2.05 and 3.04 (vs. 2.63 to 4.50 for speaking subjects). Mental ages for the nonspeakers and speakers were 4.69 and 4.34, respectively.

Each subject conversed with an examiner for approximately 1¼ hours during which the latter issued 40 nonspecific requests for clarification (i.e., "what?"). A second observer coded subjects' responses to these requests (see Appendix for coding system). Interobserver agreements in coding speaking and nonspeaking subjects' responses were .95 and .90, respectively.

## II. Project Description (Continued)

## III. Major Findings/Results:

The two groups were strikingly similar with respect to the nature of their revisions. Speakers and nonspeakers most frequently responded to their listener's requests for clarification by simply repeating their original utterances (i.e., not revising). Repetitions comprised 40% of the nonspeakers' and 35% of the speakers' responses. The second most frequently employed strategy by the respective groups was message elaborations, where utterances were syntactically and/or semantically expanded. Together with repetitions these accounted for 58.2% of the nonspeakers' and 65.6% of the speakers' responses. The only significant difference ($\alpha < .05$) noted was the nonspeakers' greater reliance upon mode changes (e.g., shifting how a message was conveyed with no ensuing change in meaning). These findings suggest that nonspeakers employ similar strategies to their speaking counterparts despite their reliance upon different primary modes of expression.

## IV. Written Manuscript/Summary Available ☐ Yes ☒ No

**From:**

* This paper has been submitted for journal consideration.

## UNPUBLISHED RESEARCH STUDIES UP

### IPCAS Study on Interaction

**Title of Research Study:** Augmentative Communication Systems: The Interaction Process

**Principal Investigator(s):**

Ann Colquhoun
59 Cliueden Avenue
Toronto, Ontario
Canada M87 3M9

**Type of Research Project:** (Dissertation, Thesis, Independent Study, Funded)

Independent/Ontario Crippled Children's Center

**Date Completed:** November, 1982

1. **Purpose(s) of the Research:**

To examine interaction patterns which take place between speaking persons and persons using an augmentative communication system.

II. **Project Description:**

Half-hour videotapes were made of seven dyads in which the conversation was between non-vocal individuals and a speaking person. The participants in each conversation were familiar to each other, and the choice of topic was essentially free.

The seven non-vocal participants were between 10 and 27 years of age, all used Blissymbolics as their major means of communication, and all used direct selection pointing as their means of indication. The speaking partners were all adults who had extensive experience with Blissymbols and the users. Five of these partners were teachers, one was a mother, and the other a friend.

Each utterance of each conversation was coded along six parameters: participant, relationship to content, type of utterance, function of the utterance, form, and mode used. (See Appendix of this report.) The number of utterances in each subcategory was totalled and converted to a percentage to allow comparison between the speaking person's and the Blissymbol user's contribution to the conversations in different parameters and subcategories. Standard deviations were also calculated to obtain an idea of the variation present.

## II. Project Description (Continued)

## III. Major Findings/Results:

1. The majority of utterances were made by the speaking person.

2. Most of the utterances had to do with the content of the conversation, although both participants also contributed to the Meta-Talk category, which was concerned with the communication system itself.

3. The speaking partners did most of the initiating, confirming, subquestioning and encouraging. The Blissymbol users did most of the responding.

4. The speaking partners used a variety of communicative functions, with the exception of statement/description. The augmentative system users primarily produced statements.

5. Speaking partners used equal amounts of full sentences and fragments. Blissymbol users used more fragments on the average (e.g., 72.3% to 27.7%).

In general, the speaking persons initiated, narrowed the field of responses, and confirmed symbol choices through questions, statements, and symbol labels using both sentences and fragment. Frequent use of subquestions to narrow the field of responses and rhetorical questions in which the answers were known to both partners were noted. The most variation occurred in the friend-friend dyad.

There is a need to consider the qualitative as well as the quantitative aspects of interactions. The general impression of the observations was that effective communication was taking place and that one participant was not totally dominating the interaction. Instead, the additional input by the speaking persons appeared to facilitate communication. The author questions the dependence on the speaking person's input and assistance for the exchanges and its effect on communication and social development. Although facilitatory, the observed patterns also did not encourage syntactical use, and question asking/information seeking on the part of the Blissymbol user.

(AWK)

## IV. Written Manuscript/Summary Available ☒ Yes ☐ No

From:

Ann Colquhoun
59 Cliueden Avenue
Toronto, Ontario
Canada M87 3M9

## UNPUBLISHED RESEARCH STUDIES UP

### IPCAS Study on Interaction

**Title of Research Study:** Listener Reactions to Three Nonvocal Communication Outputs

**Principal Investigator(s):**

Loraine Coxson and Pamela Laikko
Department of Communication Disorders
University of Wisconsin - Madison
1975 Willow Drive
Madison, WI 53706

**Type of Research Project:** (Dissertation, Thesis, Independent Study, Funded)

Master's Project, Department of Speech, Washington State University
(Under the direction of Pamela Laikko)

**Date Completed:** 1983

### I. Purpose(s) of the Research:

To examine the reactions of unsensitized and sensitized persons to communication through three communication output modes - synthetic speech, printed copy, and visual-nonretrievable output.

### II. Project Description:

Groups of adults viewed a segment of a videotape in which a normal 26 year old was communicating with a normal adult via direct selection on an Express 3. The same script was used for each output mode. Each listener group viewed only one mode of use, and noted their reaction to the interaction on a rating scale and questionnaire. The unsensitized group consisted of 69 university students outside of Communication Disorders; 51 special education and speech pathology majors constituted the sensitized group as persons with more exposure to the handicapped. The interaction consisted of 11 questions and responses by each partner in the dyad (total: 8 minutes).

## II. Project Description (Continued)

## III. Major Findings/Results:

The rating given the three communication modes by the unsensitized listeners showed significant differences. Print was rated significantly lower than speech, or non-retrievable forms of communication, and found to be more negative, less functional, and least approachable. The sensitized observers rated all forms of communication high. Results suggest that naive listeners view augmentative communication system outputs more negatively than do listeners who are more sensitive to handicapped individuals, and view print the most un-normalized of the modes evaluated. Comments from this group indicate that they would generally not initiate conversation with nonspeakers. This suggests that the nonspeaker may have to take the initiative in interaction with unfamiliar speakers if communication is to occur.

(AWK)

## IV. Written Manuscript/Summary Available ☒ Yes ☐ No

From: Pamela Laikko
Department of Communication Disorders
University of Wisconsin - Madison
Madison, WI 53706

**Title of Research Study:**

Communication Interactions - Nonspeaking Children Using Augmentative Systems

**Principal Investigator(s):**

Delva M. Culp
Callier Center for Communication Disorders
1966 Inwood Road
University of Texas
Dallas, TX 75235
(214) 783-3137

**Type of Research Project:** (Dissertation, Thesis, Independent Study, Funded)

Independent Study

**Date Completed:**

November, 1982

## 1. Purpose(s) of the Research:

To examine the communication interactions of nonspeaking children using augmentative communication systems with their mothers in the home setting.

## II. Project Description:

Five cerebral palsied children and their mothers served as subjects. These children ranged in age from 5 years 5 months, to 13 years 2 months. All used direct selection as a means of indication. Two children used upper extremity pointing; the other three used a variety of head indicators (light beam, chin pointer, head pointer). The symbols systems and aids used also varied. Three children used Blissymbolic arrays; one child used an alphabet, word, phrase book; the other child used an electronic device, the HandiVoice 110. All had used their augmentative aids for at least 6 months and received therapy at least one time per week. Receptive language scores of these children ranged from 6-4 to 7-8 years. Speech and gestural use were not reported.

The experimenter videotaped interactions in the home between these nonspeaking children and mothers. Mothers reported these interactions to be typical. The last 20 minutes of the videotaped session (25 minutes) were transcribed (Miller, 1981) and analyzed. Communications were examined for: (1) mode of communication, (2) mean length of utterance (with any gesture or vocalization counted as a morpheme), (3) communication functions (adapted from Halliday, 1975), and (4) communication effect. This last category examined communication success and initiation. An interaction was coded as successful when the listener's response was judged by the experimenter to be consistent with the intended message.

## II. Project Description (Continued)

Initiation was defined as introducing a topic or idea not previously addressed in the interaction. Reliability was addressed through coding of two children's interactions by a second examiner. Reliability was greater than 89% on all variables coded. Both examiners were previously familiar with each of the five children.

## III. Major Findings/Results:

Results indicated interactive patterns which were generally consistent across dyads such that:

1. Children used gestures and speech more frequently than communication boards;

2. Mothers dominated interactions in terms of the number of utterances (840 total utterances per mothers versus 576 total utterances for children), grammatical complexity, and M.L.U. (M.L.U. range/mothers = 5.5-8.4 versus M.L.U. range/children = 1.2-3.0);

3. Mothers used a high percentage of heuristic utterances (yes/no and WH questions), and children demonstrated extensive use of yes/no and informative utterances;

4. Mothers frequently clarified, but rarely expanded upon, the children's utterances;

5. Mothers consistently initiated more interaction than children.

However, more specific analysis of communication board/aid usage revealed that:

1. All children were able to initiate interactions successfully.

2. All children were significantly more successful in their interactions when using a communication aid than when using other symbolic modes in combination.

This study concluded that although the communication aid appeared to offer these five children increased communicative potential, the children's roles in the studied interactions continue to be extremely limited in terms of the communications examined.

Areas that should be considered for further study include: (1) the development of functional clinical measures for assessing communicative interactions of communication aid users; and, (2) development of communication intervention programs which focus on facilitation of more normal communication interactions of communication aid users and significant others in their environment.

## IV. Written Manuscript/Summary Available ☒ Yes ☐ No

From:
Delva M. Culp
Speech and Language Pathology
Callier Center for Communication Disorders
1966 Inwood Road
Dallas, TX 75235

**Title of Research Study:**

Synthesized Speech - Intelligibility Trials

**Principal Investigator(s):**

Jayne Easton
Senior Speech Therapist
Communication Aids Centre
Frenchay Hospital
Bristol, England BS16 1LE
(0272) 565656 (Ext. 204)

**Type of Research Project:** (Dissertation, Thesis, Independent Study, Funded)

Independent Study

**Date Completed:** January, 1984

## 1. Purpose(s) of the Research:

This research study investigated the intelligibility of synthesized speech in two communication devices based on a Votrax SC01 chip, the HandiVoice 110, and the WITS Chat. In particular, the intelligibility of these synthesizers was examined in relation to different groups of listeners, and a variety of linguistic tasks.

## II. Project Description:

Fourteen listeners served as subjects. These included 8 speech therapists, 5 laymen, and one synthetic speech device user. Each subject was presented with a series of listening tasks first in one synthesizer, then the other. The order of synthesizer presentation was altered for four of the subjects to examine order effects.

The intelligibility tasks included: (1) identifying 30 similiar sounding words from the listing of Yorkston and Beukelman, 1980; (2) identifying these 30 words in a 3 word forced choice situation; (3) identifying these 30 words in a forced choice situation with conversational masking introduced; (4) identifying ten sentences; (5) identifying 8 polysyllabic words; and, (6) identifying 3, 4, and 5 word phrases. Unless the task was a forced choice situation, subjects were asked to write down what they heard. Presentation was made from taped stimuli from the two synthesizers under study. Stimuli was presented at a distance of one metre from the listener in a sound damped room.

## II. Project Description (Continued)

## III. Major Findings/Results:

1. Increased exposure to synthetic speech appears to improve intelligibility for the majority of cases. In the initial task (identifying 30 words), speech therapists had superior performance. However, as the sequence of tasks continued, lay persons also increased their performance scores and performed equally with speech therapists.

2. No significant differences were noted between synthesizers studied.

3. Some subjects were consistently poorer at interpreting synthesized speech regardless of the task, and others were consistently superior.

4. Polysyllabic words and 3-5 word phrases received higher intelligibility scores than single words. Length appears to have a positive impact on intelligibility.

5. Vowel length and the presence of voiceless plosives appeared to be significant factors in intelligibility of the synthesized speech.

(AWK)

## IV. Written Manuscript/Summary Available ☒ Yes ☐ No

(Manuacript submitted for publication)

From:

Jayne Easton
Senior Speech Therapist
Communication Aids Centre - Frenchay Hospital
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(0272) 565656 (Ext. 204)

## UNPUBLISHED RESEARCH STUDIES UP

### IPCAS Study on Interaction

**Title of Research Study:** Use of Augmentative Communication Systems by Quadriplegic, Non-speaking Adults.

**Principal Investigator(s):** Iris Fishman, M.A., Director Communication Disorders Department, United Cerebral Palsy Association of Fairfield County, Inc., Bridgeport, CT 06606
Patricia Kerman-Lerner, M.A., Chief, Speech Pathology and Audiology Service Goldwater Memorial Hospital, NYU Medical Center, New York, New York 10044

**Type of Research Project:** (Dissertation, Thesis, Independent Study, Funded)

Independent Study

**Date Completed:** November, 1983

### I. Purpose(s) of the Research:

The purpose of this study was to determine the differences in the use of non-electronic and electronic augmentative communication systems by non-speaking individuals who had been given both types of systems. The hypothesis was that each type of system would be used to communicate with different persons and to discuss different topics.

### II. Project Description:

The subjects studied were three non-speaking female adults living within a large, long-term rehabilitation facility. Each had become non-speaking due to an acquired neurological disorder and was anarthric as well as quadriplegic.

Non-electronic communication systems provided for each subject included at E-tran, an Eye-link and an alphabet board whose letters were indicated through row-column scanning. Electronic systems, controlled through a single switch, included the Express I, the Apple II Plus computer and the Tufts Interactive Communicator. Each subject had used her systems for at least one year prior to this study.

Over a two week period, data were collected for each subject through audiotape of non-electronic interaction or collection of printed tapes produced using the electronic system. All were collected using two measures. The first measure identified the target person to whom the subjects addressed their communication, i.e., the person the message was intended for. These persons were either familiar or unfamiliar with the use of the subject's non-electronic system. The second measure identified the topics initiated by the subjects during communicative interaction. These included self-care, personal management (Lossing, 1981) and emotional, social, and factual issues, humor and other issues not included in the other categories.

## II. Project Description (Continued)

## III. Major Findings/Results:

The results of this study revealed that 1) the subjects used their non-electronic systems to communicate primarily with target persons familiar with the use of those systems; 2) the subjects used their electronic systems to communicate with familiar persons, and with persons unfamiliar with the use of their non-electronic systems; 3) using both types of systems, the most frequently discussed topics for all three subjects were self-care and personal management; and 4) for one subject, emotional issues were discussed more frequently using the non-electronic system than when using the electronic system.

Therefore, the results of this study indicated that non-electronic and electronic systems were used to communicate with different persons, but in general, the same topics were discussed.

## IV. Written Manuscript/Summary Available ☒ Yes ☐ No

**From:**
Iris Fishman
United Cerebral Palsy Association of Fairfield County, Inc.
130 Hunting Street
Bridgeport, CT 06606

**Title of Research Study:**

Procedure for Analysis of Communication Breakdowns

**Principal Investigator(s):** Susan Fishman
Geralyn Timler
Department of Communication Disorders
University of Wisconsin-Madison

**Type of Research Project:** (Dissertation, Thesis, Independent Study, Funded)

Independent Study in partial fulfillment of CD946 Seminar: Interaction Strategies for Augmentative System Users (David E. Yoder, Instructor)

**Date Completed:** December, 1983

## 1. Purpose(s) of the Research:

The purpose of this study was to quantify and qualify the communication interaction between an augmentative and able-bodied speaker with emphasis on communication breakdown and repair. In particular, the study examined reliability measures between six judges, and audio/video and on-line information in the study of this communicative interaction.

## II. Project Description:

A sample of an interaction between an adult communication board user and a familiar interactant was recorded on audio and videotape. A trained observer also recorded on-line all of the board user's pointing, gesturing, and vocalizing. The language board user was a 57 year old male with athetoid cerebral palsy who lives with his older sister. At home, his primary mode of communication is verbalization; with less familiar partners, he uses his language board, vocalization, pointing, and gestures. The communication partner was his speech-language pathologist.

The sample was transcribed verbatim from the videotaped recording following conventions developed for this unique interaction. A transcript was also obtained by combining the audio sample and the on-line observations.

A coding system for analysis of strategies for repair of breakdowns in an interaction between a communication board user and a speaking interactant was developed. (See Appendix.)

Strategies used by the augmentative system user include: 1) clarifications (via pointing, gesturing, vocalizing, spelling, or simultaneously vocalizing and pointing), 2) restarts, 3) reformulations, and 4) confirmations. Strategies used by the speaking interactant include: 1) checks, 2) guesses, 3) redirections to the augmentative system, 4) requests for clarifications, and 5) requests for information.

The utterance level was selected as the basic unit of analysis since

## II. Project Description (Continued)

breakdowns in communication often occur within a single utterance.

Next, the reliability of this analysis system was studied. Six graduate students were selected as judges. Each of the judges participated in a one-hour training session prior to analyzing the sample. Training included written definitions of the codes, viewing videotaped interactions and their pre-coded transcripts, coding of practice transcripts, as well as general discussion of the coding procedures. Following training, each of the judges coded a portion of the transcript from the interaction described earlier. Agreement between judges was compared with standard coding established by the authors.

## III. Major Findings/Results:

The ability of judges to use this analysis system reliably was analyzed in some detail. The results were first analyzed to determine the overall agreement between the six judges in coding the interaction sample. Next, the reliability of each individual judge was computed for the entire sample in order to discover differences between judges. Reliability of each code was also analyzed for each individual judge to determine factors contributing to differences in agreement between judges. Interjudge reliability was also computed for each code to identify which definitions resulted in the most disagreement. Finally, the frequency of usage of each code was calculated for each judge and compared to the total number of possible occurrences. This provided information on which codes were used inappropriately, which codes were neglected, and whether all judges experienced similar difficulties with some definitions.

The ability to use the coding system reliably was not uniform across judges or across definitions. Overall interjudge reliability for the six judges across all strategy types was near .80. However, overall agreement of .89 between two experienced judges indicated that experience with the coding system had a positive effect on reliability. Reliability of some strategy types was considerably lower due to problems in definition, individual judges' errors, or transcription errors.

Coding of utterance types (responses or initiations) resulted in poor reliability. Future studies will attempt to resolve this problem and identify reliably the onset and completion of utterances.

Agreement between the transcripts obtained from the audio and videorecordings was .77. This suggests that the use of audiotapes with some modifications in

Major Findings/Results (Continued)

methods of collection is a feasible option for obtaining interaction samples.

Thorough analysis of each individual code for the source of errors will direct subsequent studies which will attempt to circumvent these problems. Ongoing research is attempting to improve reliability measures through refinements in definitions and training procedures.

IV. Written Manuscript/Summary Available ☒ Yes ☐ No

From: David E. Yoder, Ph.D.
Walter-Bascum Professor of Communication Disorders
1975 Willow Drive
University of Wisconsin
Madison, WI 53706

## II. Project Description (Continued)

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Major Findings/Results (Continued)

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Thorough analysis of each individual code for the source of errors will direct subsequent studies which will attempt to circumvent these problems. Ongoing research is attempting to improve reliability measures through refinements in definitions and training procedures.

IV. Written Manuscript/Summary Available ☒ Yes ☐ No

From:

David E. Yoder, Ph.D.
Walter-Bascum Professor of Communication Disorders
1975 Willow Drive
University of Wisconsin
Madison, WI 53706

**Title of Research Study:** A Pragmatic Approach to Functional Communication Board Use

**Principal Investigator(s):**

Sharon Glennen, M.S.
Dept. of Communication Disorders
University Park, Pa. 16802
(814) 865-5414

Stephen N. Calculator, Ph.D.
Dept. of Communication Disorders
Univ. of New Hampshire
Durham, NH 03824
(603) 862-2110

**Type of Research Project:** (Dissertation, Thesis, Independent Study, Funded)

Ph.D. Candidacy/Independent Study / Penn State University

**Date Completed:** July, 1983

## I. Purpose(s) of the Research:

1. To examine the effectiveness of pairing the introduction of new lexical items on 2 nonspeaking children's communication boards with environmental manipulations designed to encourage their immediate functional use of such vocabulary to request corresponding objects.
2. To explore these childrens' tendencies to generalize training effects across listeners, vocabulary, and communicative purposes (i.e., intents).

## II. Project Description:

A single subject AB design was replicated across two nonspeaking children to examine the effectiveness of a training program upon these subjects' abilities to use novel vocabulary to spontaneously request objects. Both subjects (12; 7 and 5; 9 years of age) were using variations of the E-Tran communication display as their primary modes of communication. These children (each displaying age appropriate intellectual and receptive language abilities) were currently enrolled in EMR public school classrooms. At the onset of this study, neither child initiated many interactions. Both usually resorted to passive, nonboard modes of communication in favor of their communication board.

Each subject received 2 sessions/week of therapy designed to facilitate functional vocabulary usage. Twenty objects (toys and musical instruments) were present during each session. The corresponding untrained symbols for each of these objects were appended to the subjects' communication boards. Ten symbols were subsequently trained, the remaining 10 served as control items.

Two methods were used to encourage these children to issue object requests with their new vocabulary. In expectant delays, the examiner simply looked at the child, with an interested expression on her face, and waited 15 seconds for the child to request any one of the 20 objects. Requests were followed by immediate verbal praise and 30 seconds of play with the corresponding objects. The second technique, employed when delays failed to elicit a request, was referred to as the structured communication event. The clinician employed varying levels of prompts to engage the child's interest in possessing a particular object before him.

## II. Project Description (Continued)

In addition to these sessions, two generalization probes were conducted with a listener, naive to the purposes of this study, interacting with the subjects. Subjects' communicative behavior, particularly with respect to the newly trained vocabulary, were examined. Child Variables examined in the training and generalization conditions included: Speaking Role (initiations vs. responses), Message Mode (Those relying, partially or fully, upon the communication board vs. those conveyed through alternate nonboard strategies); and Communicative function, or, intent of the message (Request Object, Request Action, Request Information, Description, Statement, Conversational Device, Answer, Acknowledgement, Repetition, No Response, Other).

## III. Major Findings/Results:

Both children rapidly learned to initiate requests using the 10 trained symbols. The expectant delay condition was sufficient to elicit these requests 80% of the time from Subject One and 67% of the time from Subject Two. Also, both children continued to issue object requests when interacting with the second, naive listener. Neither subject displayed significantly greater uses of the alternate types of communicative functions following training. These findings suggest that pragmatic training can promote functional board use although each purpose/intent with which vocabulary is employed may necessitate individual training. Similarly, while each child increased his use of the board when issuing object requests, no parallel changes in increased board usage were observed with respect to the other communicative functions. Finally, both subjects quickly generalized training to subsequently request untrained objects.

## IV. Written Manuscript/Summary Available ☐ Yes ☒ No

From: Currently in preparation for journal review.

## UNPUBLISHED RESEARCH STUDIES UP

### IPCAS Study on Interaction

| | |
|---|---|
| **Title of Research Study:** | That's just the point: The management of speaker-listener turn exchange between an augmentative system user and his therapist. |
| **Principal Investigator(s):** | D. Jeffrey Higginbotham<br>Department of Communicative Disorders<br>University of Wisconsin - Madison<br>Madison, WI 53706 |
| **Type of Research Project:** (Dissertation, Thesis, Independent Study, Funded) | Pilot Study (Sociology) |
| **Date Completed:** | December, 1982 |

### I. Purpose(s) of the Research:

To describe the manner by which speaker/listener turntaking roles are achieved and exchanged. Specifically the purpose of the study was to examine how an augmentative system user and his natural speaking therapist exchanged speaking turns during board mediated conversation.

### II. Project Description:

The study examined a portion of a conversation occurring between an adult communication board user (congenital nonspeaker using a direct selection technique) and his therapist. A two and one-half minute episode of conversation was selected from a 20 minute black and white videotape for analysis. The videotape was recorded in the home of the augmentative communication system user. A time-code was inserted into the videotape, permitting direct recording of temporal information. The temporal resolution used in this analysis was .17 (1/6) of a second. In this study transcription was limited to the pointing and gaze and vocal behavior of the therapist.

## II. Project Description (Continued)

## III. Major Findings/Results:

For the conversational segment analyzed, the exchange of speaking turns appeared to be orderly, cooperative, and a systematic feature of the interaction. The temporal precision in which turn exchanges occurred evidenced mutual attention to the other persons actions, and it may be hypothesized that certain aspects of hand posture and movement of the augmentative system user served to signal or "project" appropriate points of turn exchange, as well as the initiation of vocalizations (acknowledgement of point) by the therapist. Finally, a system of turn exchange was proposed to describe the turn exchange options noted in the analysis.

## IV. Written Manuscript/Summary Available ☒ Yes ☐ No

**From:**

D. Jeffrey Higginbotham
Department of Communicative Disorders
University of Wisconsin - Madison
Madison, WI 53706

## UNPUBLISHED RESEARCH STUDIES

UP

### IPCAS Study on Interaction

**Title of Research Study:**

The Occurrence of Breakdown During the Interaction Between a Familiar and Unfamiliar Listener and an Augmentative System User

**Principal Investigator(s):**

Mary Huschle
Tracy Staudenbaur
Department of Communication Disorders
University of Wisconsin - Madison

**Type of Research Project:** (Dissertation, Thesis, Independent Study, Funded)

Paper submitted in partial fulfillment of CD946 Seminar: Interaction Strategies for Augmentative Communication System Users (David E. Yoder, Instructor)

**Date Completed:** Fall, 1983

### I. Purpose(s) of the Research:

The study compared the occurrence of communication breakdown and how it is resolved in interactions between a communication board user and a familiar, and unfamiliar partner.

### II. Project Description:

The aided speaker was an adult with cerebral palsy who had used a word, phrase, letter communication board for the past six years. Spelling skills were limited, however, he was able to spell some words, and approximate or give the first letter of others. Communication was also attempted through vocalizations and gestures. The familiar communication partner was his speech-language pathologist. The unfamiliar listener was a college student who had experience teaching handicapped students, but no experience with the subject or augmentative aid users.

Conversation between the interactants was left open to the participants. However, they were asked to discuss some mutual and unmutual likes on television as a start. The interaction was videotaped. Twenty minute segments from each dyad were selected for the analysis.

Interactions were transcribed and coded using the system developed by Fishman and Timler, 1983 (See Appendix). These interactions were analyzed for: (1) the total number of completed utterances by the nonspeaker with both partners; (2) the number/percent of breakdowns and the type with each partner; (3) the number of checks and guesses made by the verbal partners that were appropriate and inappropriate; (4) the mode used that resulted in the breakdown; (5) the number of times the listener did not respond to the nonspeaker's communicative intent, and, (6) the strategies used by the nonspeaker that resolved the breakdown.

II. Project Description (Continued)

III. Major Findings/Results:

Findings were:

1. A greater number of exchanges occurred with the familiar partner than the unfamiliar.
2. A greater number of completed utterances occurred with the familiar partner (41 vs. 17 for the unfamiliar).
3. In conversation with the unfamiliar partner, 35% of the utterances had some communication breakdown. With the familiar partner, this occurred on 24% of the utterances.
4. Both partners made guesses regarding the nonspeaker's utterances. 57% of the familiar partner's guesses were appropriate; 25% of the unfamiliar partner's guesses were appropriate.
5. The most frequently used mode by the nonspeaker that contributed to communication breakdown with the familiar partner was verbalization (88%). The breakdowns between the unfamiliar partner and board user were equally divided between verbalizations of the nonspeaker, and inappropriate guesses and checks by the unfamiliar partner.
6. The unfamiliar partner did not respond to 6 intents of the nonspeaker as opposed to 1 with the familiar. The no responses occurred when the nonspeaker was using non-board modes of communication.
7. The repair strategies used by the nonspeaker did not differ with these two partners. Most frequently used was a pointing clarification on the board, followed by an attempted spelling.
8. It took fewer exchanges for repair in interaction with the familiar partner, than the unfamiliar.
9. It was observed that the unfamiliar partner often asked questions in which the answers were known to both partners, and did not repeat each letter as indicated in the spelling mode.

(AWK)

IV. Written Manuscript/Summary Available ☒ Yes ☐ No

From: David E. Yoder, Ph.D.
Walker-Bascom Professor of Communication Disorders
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University of Wisconsin
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## UNPUBLISHED RESEARCH STUDIES UP

### IPCAS Study on Interaction

**Title of Research Study:** Clinical Impressions of the Interaction Strategies of Two Non-speaking (NSPH), Physically Handicapped Individuals

**Principal Investigator(s):**

Kim Rae (Sauchelli) Jolie, M.A., C.C.C.
Coordinator, Augmentative Communication Program
Children's Specialized Hospital
Mountainside, NJ 07901

**Type of Research Project:** (Dissertation, Thesis, Independent Study, Funded)

Independent Clinical Project

**Date Completed:** October, 1981

**I. Purpose(s) of the Research:**

This clinician had the opportunity to work with two youngsters with cerebral palsy, hearing impairment and oromotor dysfunction. Their oral speech was unintellibible, requiring augmentative communication assistance. They utilize a combination of vocalization, sign/gestures, and Canon Communicators to communicate. The purpose of this project was to obtain information regarding their interaction skills.

**II. Project Description:**

The interactions of these two NSPH children were documented by saving the hardcopy Canon output and transcribing the interaction content with addition of the semantic context (i.e., gestures/signs, eye gaze, as well as other communication modes which clarified the meaning of the message). All participants in the dyad, including speaking partners, utilized the Canon Communicator(s). The speakers did so to provide modeling for the two youngsters; however, the additional hardcopy allowed for thorough transcription of the language sample content. Such samples were collected over an eighteen month period and included numerous communication dyads.

II. Project Description (Continued)

III. Major Findings/Results:

The following statements are clinical impressions and ideas obtained from documented information of several NSPH children's interactions during an eighteen month period:

1. Initially, output was very academic and non-social (i.e., labeling and describing stimulus when asked). It was evident from a training perspective that therapy needed to focus on social interaction skills, which developed during intervention.

2. There was a need to balance the speed of output with the accuracy of content, form, and spelling to insure clarity and maintain the interest of others.

3. The NSPH children utilized a combination of expressive output modes, i.e., Canon Communicators, manual word/alphabet language board, and manual sign language which seemed to expedite communication.

4. They often utilized old forms (i.e., manual language board and sign (gesture) to describe new content, which could then be expressed via the new system (i.e., Canon Communication) with training.

5. During peer interactions, when one NSPH child was without his/her electronic device (Canon), the other automatically loaned theirs.

6. Over time, a great reduction in errors occurred.

7. It was beneficial for speaking partners to utilize the Canon Communicator as there was frequently an increase in the NSPH child's use of the provided information.

8. There was a significant increase in the number of utterances expressed during

**Major Findings/Results** (Continued)

a given time period.

9. Significant increases occurred in spontaneous and legible conversation outside the structured setting, demonstrating increased generalization skills with a variety of professionals and peers.

10. The NSPH children demonstrated extreme difficulty with topic shifts, which needed to be trained.

11. Turn-taking initially was used minimally but increased over the time period, with training and encouragement.

12. Interaction content that occurred in sessions with one of the NSPH children and the clinician was later seen during interactions between the two NSPH children.

13. Over time, there was increased attempt to reintroduce topics that were unclear or unfinished, with a notable increase in urgency or desire for communication.

14. Although there was a need for the clinician to facilitate a convenient exchange between the two NSPH individuals, they utilized natural, unsophisticated behavior to initiate and maintain the attention and humor of each other.

15. There was a major increase in the NSPH children's ability to initiate questions over time, following training that was essential for sustained and diverse dialogue.

16. A general increase in the children's active participation in classroom and social situations was evident which seemed due to this increased ability to initiate.

17. An emergence of information output when the context was known by the listener was observed, adding to their social and communicative competence.

18. There was an increase in social openings and closings of sessions, initiated by the NSPH children over time.

19. There was an increase in their ability to express emotions using language over time.

20. Following a period of therapy, there was a decreased number of rote social phrases as they developed ability to express varied information.

21. There was evidence that the children utilized expressions modelled by the clinician at a later time to express their own needs appropriately.

22. There was an increase in abstract concepts and information.

23. Increased communication breakdown was evidenced following a vacation period where intensive therapy was briefly interrupted, stressing the importance of intervention.

IV. **Written Manuscript/Summary Available** ☐ Yes ☒ No

**From:**

**Title of Research Study:**

Augmentative Communication System Use in an Institutional Setting - A Case Study

**Principal Investigator(s):**

Arlene Kraat
Queens College Speech and Hearing Center
65-20 Kissena Blvd.
Flushing, New York 11367

**Type of Research Project:** (Dissertation, Thesis, Independent Study, Funded)

Independent Study

**Date Completed:**

October, 1979

## I. Purpose(s) of the Research:

This study focuses on the communication interaction that occurred in a two week period between an adult Canon Communicator user and others in a large institution for the long-term care and rehabilitation of the physically disabled.

## II. Project Description:

The non-speaker studied was a 46 year old man, J., with a diagnosis of Dystonia Muscularium Deformens. The Dystonia was first observed at the age of 8 years and slowly progressed to adulthood. J. received a high school equivalency diploma through tutoring in his home. He was institutionalized at the age of 29 in a large long-term care facility for adults who had physical and mental disabilities.

At the time of the study, J. had been severely speech-impaired for ten years, and used a motorized wheelchair for mobility. Communication was accomplished through vocalizations, head and gross hand gestures, a Canon Communicator, and laughter/smiling. He had been using the alphabet, print-out communication device for approximately one year prior to the study, and appeared to be an adequate communicator in treatment situations with his therapist. J. reported difficulty in getting people to talk with him in everyday situations around the institution. This discrepancy prompted the investigation.

J. was observed in a variety of institutional environments, at different times of the day, over a two week period. The total observation time was ten hours, and included observations during morning care, lunch time, therapy sessions, recreational activities, and free times throughout the day and early evening. Communication interactions in the natural environment were transcribed on-line as they occurred. The non-speaker's and communication partner's gestures, vocalizations, and verbal or written

## II. Project Description (Continued)

utterances (Canon) were transcribed, and the communication context described. The # of interactions that occurred, the number of different communication partners that interacted with the nonspeaker, and the length of the exchanges by utterances/turn were tabulated from the transcriptions. In addition, the utterances of the nonspeaker and verbal partners were examined in terms of who initiated a conversational sequence or topic; who terminated the exchange; whether or not the utterances were required (obligatory) or optional (Blank, Gessner, Esposito, 1979); whether or not obligatory responses were minimal or expanded, and the mode(s) used. The transcribed utterances were further coded for speech function as social greetings, requests for actions, objects, or information, comments, and giving information (yes/no, agreement, contentive).

## III. Major Findings/Results:

1. During the 10 hours of observation, J. interacted with 9 different communication partners, all of whom were staff members. Opportunities were present for interaction with other patients in the large institutional environment (2,000 beds), but these did not occur.

2. The communication exchanges that did occur took place in three hours of the observed ten.

3. J.'s participation over the ten hour period was 112 turns of one utterance each. Only 29 of these involved his use of the Canon Communicator. Interactions were often two-four turns in length. Occasionally, the conversation was longer, particularly if information was sought by a staff member.

4. All interactional sequences except two were initiated by someone else. The two begun by J. involved: an interaction with a favorite clinician after a vacation period, and ordering a hamburger in the canteen. All conversational sequences were terminated by the verbal partner.

5. J. primarily responded to obigatory utterances made by others. Of the 112 turns he took, 94 were required by the prior utterance (e.g., a question). Social acknowledgements or agreement/acknowledgements constituted the majority of non-obligatory turns.

6. In general, verbal partners did not address J. in a manner that required or expected a highly informative or extended participation. However, it was also observed that J. did not take opportunities available to participate more. Obligatory responses were minimal, and addressed the question specifically without extension or elaboration.

Major Findings/Results (Continued)

7. The majority of the exchanges involved 1-2 word question answering or social responses by J. Question asking, giving of information in a sentence form, and a comment were observed, but occurred infrequently.

8. There were no observations of prediction used by communication partners. There was one use of message preparation in advance by J.

9. J. used non-verbal and vocal means of communication when it was acceptable and appropriate. He also used these old patterns of communication at times when the use of his Canon Communicator could have made the utterance more explicit. Gesture use in these instances resulted in ambiguous or incomplete messages.

10. Messages that were highly informative and contentive took 1-2 minutes to construct (e.g., "A. put it on because the holes are bigger").

11. Verbal partners were observed to introduce new topics or talk during the construction of a written communication on the Canon. They also asked and frequently answered their own questions in an exchange.

The study demonstrated a discrepancy between J.'s communication with his therapist and his interactions with others in the institution. In the everyday environment, staff and patients infrequently approached J. for communication and expected little substantive communication from him. J., on the other hand, rarely took the initiative to start a conversation, or use strategies (e.g., go to his Canon) to alter a series of unproductive yes/no questions being asked of him. J. also infrequently took a turn in an non-obligatory context when he could have. In conversation with his therapist, the pattern of exhange for both partners was markedly different than that observed outside. A training program was outlined that addressed the problems observed.

IV. Written Manuscript/Summary Available ☐ Yes ☒ No
From:

**Title of Research Study:**

A Consideration of Family Factors in the Use of Alternative Communication Systems for Non-Speaking Children

**Principal Investigator(s):**

Judith Levy, MSW, LCSW
Jane Strobino, MSW, ACSW/LCSW

**Type of Research Project:** (Dissertation, Thesis, Independent Study, Funded)

Non-Funded, Exploratory Study

**Date Completed:** February 1972

## 1. Purpose(s) of the Research:

To investigate family use of and perceptions about alternative systems of communication for handicapped individuals;
To investigate the role of social workers in facilitating use of alternative communication systems among such families.

## II. Project Description:

During the months of January and February 1982, social workers at the JFKI conducted telephone or in-person interviews designed to elicit information about: the extent to which alternative systems of communication are used by clients for whom they are recommended; client perception of the advantages and disadvantages of the alternative system of communication; and parental perception related to value and usage of an alternative system of communication as well as the impact of the alternative system of communication on improving communication within the family.

Data was collected on characteristics of the handicapped individual, the family and the types of alternative systems of communication that were recommended and/or in use.

Characteristics of the handicapped individual included: age, gender, diagnoses, current school/program placement, adaptive skills, and report of likes and dislikes of the communication system.

Family characteristics included marital status, race, income, education and number of other children living at home. Also obtained was information related to parental perception of the importance of the communication system, its cost, the extent of the communication problem, parental response to the communication problem, and parental likes and dislikes about the communication system.

II. **Project Description** (Continued)

III. **Major Findings/Results:** The study revealed a group of multihandicapped individuals, only a third of whom were ambulatory. About half of these individuals used some other adaptive device in addition to the alternative system of communication. Two thirds of these individuals were school age and ninety percent were enrolled in some type of educational or day program placement.

Seven of the handicapped individuals themselves were interviewed, and the following data generated. Three individuals were embarassed to use their communication system outside of the home; three individuals considered their communication problem as "pretty serious", whereas three other individuals considered it not such a problem; five individuals said that communication was not a problem at home; and six hoped for oral communication in the future.

In this study, families were generally intact, caucasian, lower middle income with the parents having a high school education and having other children at home. The majority of parents acknowledged that communication is sometimes a problem for themselves and their child but that the problem occurs away from home more than at home. Both parents and clients reported that improvement in communication is what they like most about alternative communication systems. What is disliked is the lack of resolution of the communication difficulty.

Types of communication systems being used by this group included: sign language, communication boards, E-trans, orthographic devices, Blissymbols and electronic boards. For many, the communication system had undergone some change or adaptation based on client needs or practical considerations.

It is noteworthy that parents do adapt to the communication problems and often develop their own methods of communicating with and understanding their child which may or may not include the alternate system designed by professionals for them.

Consequently, it is important that the professional sector consider the meaning that both the communication difficulty and the recommended treatment have for the family and the client. Additionally, a treatment approach that utilizes the entire family system in the design of equipment as well as ongoing useage and adaptations, is recommended.

IV. **Written Manuscript/Summary Available** ☒ Yes ☐ No

**From:**
Jane Strobino, DSW
John F. Kennedy Institute
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## UNPUBLISHED RESEARCH STUDIES    UP

### IPCAS Study on Interaction

**Title of Research Study:** Pragmatic Language of Cerebral Palsied Adult Speakers and Augmentative communication Device Users in a Group Interaction

**Principal Investigator(s):** Barbara A. Lewis, M.A.
and
Danielle N. Ripich, Ph.D.

Department of Communication Sciences, Case Western Reserve University, Cleveland, Ohio 44060

**Type of Research Project:** (Dissertation, Thesis, Independent Study, Funded)

Independent study in cooperation with United Cerebral Palsy Association, Inc. of Cuyahoga County, Cleveland, Ohio 44106

**Date Completed:** September 1983

I. **Purpose(s) of the Research:** The purpose of this study was to document discourse patterns of a group of communicatively impaired cerebral palsied adults. Dysarthric speakers were compared to augmentative communication users for differences in communicative interactions. It was hoped that objectifying discourse patterns would offer insight into pragmatic abilities and deficits of vocal and nonvocal communicators in group conversations.

II. **Project Description:** Two dysarthric speakers, two Bliss board users, and two staff members (a social worker and a speech pathologist) from the United Cerebral Palsy Adult Workshop in Cleveland, Ohio, served as subjects. All clients were multiply handicapped, wheelchair bound and totally dependent in all activities of daily living. Augmentative communication users had no standard expressive communication system until Bliss symbolics were introduced five years previously. Client 3 employed over 800 symbols and client 4 over 100.

Four one hour counseling discussion group sessions were videotaped. Participants discussed problems that they encountered as a result of their multiple handicaps and methods they used to deal with them. Through purposive sampling a representative 300 utterance segment was selected for analysis. The utterances were transcribed verbatim with contextual notes, segmented into communicative acts, and coded according to communication function (Prutting, 1978). Conversational turns were timed to the nearest second.

II. Project Description (Continued)

III. Major Findings/Results: Results showed that the vocal clients produced significantly more utterances of longer length than the nonvocal clients. In addition, they utilized more communication time than the nonvocal clients. Results of the communication act analysis showed an equal sharing of acts by staff (51%) and clients (49%). Closer examination of communication acts, showed not only a difference in the quantity of acts (vocal clients producing three times as many than nonvocal clients) but a functional difference as well. The vocal clients generally produced statements and the nonvocal clients made responses. Neither vocal nor nonvocal clients produced many requests.

Differences between the vocal and nonvocal clients may be explained in several ways. First, the augmentative communication user may be less proficient at gaining control of conversational turns than the dysarthric speaker. Also, a visual communication system may be less effective than an auditory one at signalling the desire to communicate. Thus, the augmentative communication user controlled less conversation time.

Several explanations for the predominence of responses of the augmentative communication user may be proposed. First, augmentative communication users, especially those learning a system in adulthood, are passive and used to a question-answer conversational mode. Second, the systems, themselves, may result in a question-response pattern. Finally, the nonvocal communicator may be perceived as a less able conversationalist.

IV. Written Manuscript/Summary Available ☒ Yes ☐ No

From:

**Title of Research Study:**

A Technique for the Quantification of Non-Vocal Communication Performance by Listeners

**Principal Investigator(s):**

Carole Ann Lossing
Supervisor, Occupational Therapy
Harborview Medical Center
325 Ninth Avenue
Seattle, WA 98104

**Type of Research Project:** (Dissertation, Thesis, Independent Study, Funded)

Master's Thesis Under the Direction of David R. Beukelman, University of Washington

**Date Completed:** May, 1981

I. **Purpose(s) of the Research:** The purposes of this research study were to: (1) develop a technique for the quantification of communication performance of nonvocal individuals in their natural environments; (2) determine the reliability of communication partners as observers of communication performance in comparison to trained observers; (3) determine the impact of partner's involvement in data collection on their interaction patterns with the nonvocal partner; and, (4) to identify the percent of communication exchanges which relate to self-care and/or personal management.

II. **Project Description:**

Four dyads were studied. Each nonvocal person was observed communicating in his or her natural environment at home or school with another person who was primary to the nonvocal person in that setting. The four nonvocal subjects ranged in age from 11 years to 28 years. Two of these subjects were nonspeaking as the result of cerebral palsy; the other two had acquired traumatic brain injuries. Three of the subjects lived at home and attended school; the fourth lived in a nursing home owned by his parents and attended community college. The nonvocal subjects used a variety of augmentative systems; S1 used eye coding and a Morse Code unit; S2 used a Canon Communicator and gesture; S3 used a communication board with words, phrases, and letters, and a Morse Code unit; and S4 used a Canon Communicator and gesture. Three of the four nonvocal subjects had no intelligible speech; the fourth had approximately 5% intelligibility. All needed assistance with at least 85% of self care activities such as feeding, bathing, dressing. The communication partners were parents, siblings, teachers and therapists.

Communication was observed for six hours per subject. The researcher completed an on-line Communication Profile for the total observation time; communication partners completed only a one hour Communication Profile, or a questionnaire following a session. The Communication Profile coded communicative intent, the modes used, the person who was the initiator of the exchange, the environment, the number of exchanges related to selfcare and personal management, and the hours of observation. The Profile is included in the Appendix. Communication

## II. Project Description (Continued)

partners were given up to 45 minutes of training on the form prior to its use. The Questionnaire was filled out after an hour of communication by a primary communicator in the environment. This Questionnaire asked for estimates of the types and number of exchanges that had transpired; the areas addressed were similiar to the Profile categories.

## III. Major Findings/Results:

1. The total number of exchanges varied over the three conditions: Condition I in which the communication partner filled out the Profile as events occurred, Condition II in which the partner filled out a questionnaire following the exchange, and Condition III in which the partner had no data collection or post conversation obligations. Fewer over-all interactions were tabulated for Condition I. The most interaction occurred in Condition III over subjects.

2. More initiations were made by the nonvocal subjects under Condition I in which the partners were tabulating information on-line.

3. The most frequent communicative intents expressed by the non-vocal subjects were: response to yes/no questions, response to other question forms, requesting information, and providing information.

4. No communicative breakdowns were recorded.

5. Only six instances of self-care and personal management communications were observed across subjects. This may have been due to the context observed, time of day, and the presence of an observer.

6. Communication partners attained greater agreement with the researcher on the Questionnaire than they did on the Communication Profile.

7. In general, there was poor reliability between the researcher's tabulations on the Communication Profile, and the observations made by the communication partners. This poor inter-rater reliability might be improved through more specific training of the partners. This needs to be explored.

(AWK)

## IV. Written Manuscript/Summary Available ☒ Yes ☐ No

From: Article based on the study: Lossing, C., Yorkston, K., and Beukelman, D., Quantification of Non-Vocal Communication Performance in Natural Settings, Archives of Physical Medicine and Rehabilitation (In press)

## UNPUBLISHED RESEARCH STUDIES UP

### IPCAS Study on Interaction

**Title of Research Study:**

Synthetic vs. Natural Speech and Comprehension in Blind and Sighted Adults

**Principal Investigator(s):** Karen Elizabeth Luxton
Director, Computer Center for the Visually Impaired
Baruch College
The City University of New York
17 Lexington Avenue, Box 264
New York, New York 10010

**Type of Research Project:** (Dissertation, Thesis, Independent Study, Funded)

Doctoral Dissertation, Teachers College, Columbia University

**Date Completed:** 1983

### I. Purpose(s) of the Research:

This research study examined the effect of synthesized speech on the language comprehension abilities of blind and sighted adults at three levels of verbal ability. Of particular interest was the differences in comprehension of synthetic and natural speech, differences between blind and sighted listeners, and the interaction of verbal ability.

### II. Project Description:

Two speech modes were examined: synthetic speech using the Kurzweil Reading Machine, Model 3, and taped human speech recorded by a male reader whose pitch and speed of presentation was approximately 175 words per minute in both modes. The comprehension task consisted of taped versions (human and synthesized speech) of the Sequential Test of Educational Progress (STEP), Form 1A, Educational Testing Service, which is a test of comprehension used for grades 13 and 14. This test requires that 10 short selections (ranging from 30 seconds to five minutes) be read aloud. Each selection is followed by questions and multiple choice answers that test comprehension of facts, overall concepts, and main ideas.

Subjects were 30 blind and 30 sighted individuals who had at least two years of college. All were native English speakers. These subjects did not use synthetic speech in their work or study, nor had prolonged exposure to the Model 3 machine. Blind subjects used Braille as their primary reading method. Half of the subjects (30) took the test using the Kurzweil machine; the other half (30) heard taped natural speech.

## II. Project Description (Continued)

All subjects were administered the vocabulary portion of the Wechler Adult Intelligence Scale and were divided into three levels of verbal ability: low - a score of 61 or below; medium - a score of 62-68; or high - 68-80. All synthetic speech subjects were interviewed after the comprehension tasks regarding the test, strategies used, and general impressions of synthesis use. The experimental tasks were presented through earphones in a quiet room which was not soundproofed. Subjects using synthetic speech went through a short training task prior to the experimental test to acquaint them with the synthesized speech.

## III. Major Findings/Results:

1. There were no significant differences found between the sighted and blind subjects on the listening task.

2. Synthetic speech was not comprehended as well as natural, taped speech. This was significant.

3. The subject's verbal ability appears to be correlated with performance on the comprehension tasks across modes. The synthesized speech mode was particularly detrimental to subjects with low verbal ability given this comprehension task.

4. Sections of the STEP Test appeared to vary in difficulty for both the synthetic and natural speech conditions.

5. Subjects comprehending the synthesized speech material reported particular difficulty with the lack of inflection, and unexpected mispronunciations, skips and switches to oral spelling in the Model 3. They also felt that the task took considerable effort and concentration. There were frequent reports of competing efforts in regard to word identifications and maintaining the comprehension of the material as a whole.

(AWK)

## IV. Written Manuscript/Summary Available From:

☐ Yes ☒ No

(See University Microfilms International.)

## IPCAS Study on Interaction

**Title of Research Study:**

Blissymbolics and Manual Signing - A Combined Approach to Communication

**Principal Investigator(s):**

Alison MacDonald, Chief, Speech Therapist
Scottish Council for Spastics
Edinburgh
Scotland

**Type of Research Project:** (Dissertation, Thesis, Independent Study, Funded)

Independent Study

**Date Completed:** June, 1983

### I. Purpose(s) of the Research:

To compare the expressive use of manual signing and Blissymbolics in a single case study. In particular, to answer the following questions: (1) Is one type of utterance produced more in one system than the other? (2) What parts of speech are used in the two systems and is the usage parallel? and, (3) How many signs or symbols are being strung together?

### II. Project Description:

The subject studied was a 12 year-old boy with athetosis and severe hearing loss, who is ambulatory. At the age of 7 years, this child began simultaneous training in Blissymbols and signing as a means of communication for both comprehension and expression. At the time of this study, he had a sign vocabulary of well over 350 signs, and used a Bliss chart containing over 400 symbols. He used both systems spontaneously, and with equal fluency and proficiency, often switching from one system to the other to accomodate the communication partner, or as a back-up to ensure understanding.

Conversational samples were collected over a 15 month period between this young boy and the same communication partner. This partner also had equal fluency in both systems. These samples were transcribed and coded under the following categories: repetition, social responses, answering questions (same medium/other medium), naming, picture description, requesting, disagreement, questioning (implied/question word), spontaneous comments and joking.

## II. Project Description (Continued)

## III. Major Findings/Results:

Although the non-speaker used both modes with approximately the same frequency, these modes were used for different functions. Social responses were infrequent and restricted to signing; requests were usually signed; spontaneous comments and reporting occurred twice as often in Bliss. The boy frequently alternated between two modes within the same utterance. This movement was more often from sign into Bliss, than vice versa. The parts of speech most frequently used were nouns, followed by adjectives and verbs. Bliss was preferred for the more static visual concepts (nouns and adjectives) while signing was preferred for verbs. In general, manual signing was preferred for short, spontaneous remarks and Bliss for longer utterances.

(AWK)

## IV. Written Manuscript/Summary Available ☒ Yes ☐ No

**From:**

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## UNPUBLISHED RESEARCH STUDIES UP

### IPCAS Study on Interaction

**Title of Research Study:**

What Was That You Pointed To?: An Examination of Breakdown in Augmentative Communication Interaction

**Principal Investigator(s):**

Pamela Mathy-Laikko
Ann Ratcliff
Department of Communication Disorders
University of Wisconsin - Madison

**Type of Research Project:** (Dissertation, Thesis, Independent Study, Funded)

Paper submitted in partial fulfillment of CD946 Seminar: Interaction Strategies for Augmentative Communication System Users (David E. Yoder - Instructor)

**Date Completed:** December, 1983

I. **Purpose(s) of the Research:** To develop methodology for identifying communicative breakdowns and repairs in interaction samples between augmentative communication users and speaking interactants. To pilot this methodology in this study of an interaction between a language board user and two communicative partners, one familiar with the user, and the other unfamiliar with the user and augmented speakers.

II. **Project Description:**

The interaction samples used were collected in a television studio in which an adult language board user and either a familiar partner (graduate student) or an unfamiliar partner (graduate student) were asked to converse about any subjects they wished. To start off the exchange, it was suggested that they talk about particular television shows of mutual interest to them, and not of mutual interest. The board user was nonspeaking as a result of cerebral palsy. His communicative system consisted of verbal yes/no responses, one and two word phrases which were generally unintelligible to the interactants, and direct selection of a word, phrase, and spelling with his left index finger on a language board.

Thirty minutes of interaction were videotaped for each dyad. These video recordings used two cameras simultaneously - one focused on the interactants from the waist up; the second on the communication board itself. A time code added to the sampling denoted intervals of a tenth of a second. Twenty minutes of the total sampling was transcribed for the analysis. Instances of communicative breakdown were identified and examined for the cause based on a premliminary model proposed by Riley (1980). This model examined degrees of coherence in the discourse in terms of four levels: interaction, illocution, content, and realization.

## II. Project Description (Continued)

## III. Major Findings/Results:

During the twenty minute interaction sample, nine instances of breakdown were identified. These were described in detail. The most frequently identified breakdown was in the level of realization (in the actualization of the message bearing elements (verbal, paralinguistic, non-verbal) in an utterance. In this particular dyad, the limited vocabulary available to the nonspeaker, his limited language and spelling skills, as well as a reduced communication rate contributed to difficulties in message formulation.

Following each communication breakdown, either the speaker or nonspeaker did something toward resolution of the difficulty. Intervention goals for these dyads are suggested to both prevent communication breakdown and to assist in the resolution when they occur. From this pilot study, it appears that a multi-level model for examining communicative breakdown and repair is appropriate for this type of discourse study.

(AWK)

## IV. Written Manuscript/Summary Available ☒ Yes ☐ No

**From:** David E. Yoder, Ph.D.
Walker - Bascom Professor of Communicative Disorders
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University of Wisconsin
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## UNPUBLISHED RESEARCH STUDIES UP

### IPCAS Study on Interaction

**Title of Research Study:** Hey You, I've got something to say: A study of the attention-getting ability of a nonspeaking, physically disabled pre-schooler.

**Principal Investigator(s):**

Maureen Miller and Arlene Kraat
Communication Arts and Sciences
Queens College - City Univerisyt of New York
Flushing, NY 11367
(212) 520-7358

**Type of Research Project:** (Dissertation, Thesis, Independent Study, Funded)

Experimental Study for partial Fulfillment of Master of Arts degree

**Date Completed:** May, 1984

### I. Purpose(s) of the Research:

The purpose of this study was to: 1) develop a context and methodology for studying attention-getting behaviors in nonspeaking children; 2) examine, as a pilot for the design, the attention-getting ability of a 5 year old nonspeaking child in an experimental context representative of a variety of environmental situations in which attention-getting behaviors might occur; and, 3) to attempt on-line coding of attention-getting behavior for this child in a naturalistic context, and compare results with those obtained in the experimental context.

### II. Project Description:

Attention-getting behavior was examined in an experimental context and in a naturalistic situation for a five year old boy with cerebral palsy and severe speech impairment. The subject of the study, G., was non-ambulatory, and had moderate athetosis. Receptive scores on the Callier Azusa Scale placed him receptively at the 3 year old level. G. had several behaviors under his control through which to gain attention and communicate. These included: eye gaze, arm pointing, vocalization, banging with his feet or arm, head turn and use of a direct selection symbol board. G. had received daily communication and speech development training since the age of three.

Experimental Context - In the experimental context, several activities and events were created that had a high probability of eliciting the desire to communicate on the part of the nonspeaker. Eight toys and activities that the nonspeaker was motivated to interact with and about were selected by his clinicians and his mother. For this particular boy, this included toys and activities such as playing with the cash register, participating in a basketball game, wanting to get a turn, seeking help when his tape recorder did not work, etc. Situations were outlined for each activity that would have a high probability of eliciting attention-getting behavior from the subject. These were based on the past experiences of the family and clinicians.

Contexts in which attention-getting behaviors might occur in everyday interactions were outlined. These included situations in which the able-bodied partner is looking or not looking at the nonspeaker, noisy vs. quiet environments, varying

## II. Project Description (Continued)

proxemics between the partner and the nonspeaker, and an occupied/unoccupied state of the able-bodied person. A script was devised for the experimental play context in which these environmental conditions were varied. See Appendix for play contexts and script.

One of the clinician/researchers who was familiar with G. served as the Communication partner in the experimental condition. The script served as an outline, but the researcher was allowed to modify the script if predicted interactions did not occur. The partner responded to the nonspeaker whenever an attempt to gain attention was recognized. Play continued until 20 attempts at getting attention were tabulated or 45 minutes of interaction had occurred.

The experimental play context was videotaped and analyzed by two examiners for attention-getting sequences; modes used to gain attention, overall, and in various environmental conditions; successfulness of attempts; whether or not there was any alteration in attention-getting behaviors following an unsuccessful attempt, and the over-all patterns used. (See Appendix for definitions.)

Naturalistic Context - G. was also observed in his home during the evening mealtime interacting with his mother. This context was used as the mother reported the greatest frequency of interaction occurred during this time period. The two researchers who had analyzed the videotapes of the experimental condition served as the on-line coders for this naturalistic context. The environmental conditions, modes used by G. to gain attention, and the successfulness of these attempts were coded in five minute intervals.

## III. Major Findings/Results:

In the experimental condition, G. attempted to gain the partner's attention 48 times. Three other events were interpreted by the partner as behaviors to gain attention, but in fact were not (e.g., touching the partner by mistake). 79% of G's attention-getting attempts were successful. He was most successful in situations in which the partner was looking at him, or in close proximity. G. was least successful in environmental conditions in which the partner was not looking at him and/or occupied with an activity. G. not only attempted to gain attention in the contexts developed, but utilized conversation opportunities to gain attention to shift to another topic of conversation (e.g., When asked a question, rather than answer, he gained attention for another topic.)

The most frequent mode used to gain attention was combined use of arm-pointing and eye gaze, or vocalization and eye gaze. Some modes were infrequently used (i.e., touching, physical action on objects, banging noises) although they could have been successfully used. In terms of patterns, multiple modes used simultaneously occurred most frequently, followed by multiple modes used in a sequential pattern, followed by single mode use. About half of the attempts to gain attention embedded both attention-getting and a content/topic cue; the other half functioned to gain attention first, and were followed by further semantic/linguistic information. G. demonstrated the ability to shift attention-getting strategies across environmental conditions.

Attention-getting breakdowns occurred most often because of a weak signal (e.g., vocalization or arm movement was not sufficient for context), or use of an inappropriate mode (e.g., arm pointing when the partner is not looking). G. was persistent in unsuccessful attempts 93% of the time, and often amplified or altered his mode in the subsequent attempts.

Major Findings/Results (Continued)

The coding of attentional behavior in the environment using on-line coding was unsuccessful. The coders did not achieve the designated level of reliability using the system outlined.

The methodology for examining attention-getting behavior devised for the experimental condition appears to be appropriate for further application and study. Of particular interest are validity issues.

IV. Written Manuscript/Summary Available ☒ Yes ☐ No

From:
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## UNPUBLISHED RESEARCH STUDIES UP

### IPCAS Study on Interaction

**Title of Research Study:** Reading and Verbal Ability and Single Word Comprehension of Synthesized Speech by Developmentally Disabled Adults.

**Principal Investigator(s):** Meredith L. Morgan,ccc/sp.

Gail J. Wolff, ccc/sp.

**Type of Research Project:** (Dissertation, Thesis, Independent Study, Funded)

Independent Study

**Date Completed:** October 10, 1983

1. **Purpose(s) of the Research:** Nonverbal and nonreading individuals have fewer redundancies from past experiencing upon which to draw when decoding distorted speech signals due to their inability to employ personal knowledge of the sensory aspects of speech production and visual images of orthography. The purpose of the study was to determine whether or not the degree of verbal and/or reading ability that developmentally disabled adults possess will effect their ability to decode the distorted speech signal produced by a text-to-speech synthesizer.

II. **Project Description:** Each of the 39 developmentally disabled adults participating in the study were assigned to one of nine groups according to their level of verbal and reading abilities. Verbal level was determined by the subject's primary mode of communication and by their speech intelligibility level as subjectively judged by the examiner. Reading level was determined by the score obtained on a nonstandardized sight word recognition test.

Three levels of verbal ability and three levels of reading ability were identified, composing the cell member criteria for the 3x3 design:

Verbal Level 1: Primary mode of communication is nonverbal and speech intelligibility is less than 25%.

Verbal Level 2: Primary mode of communication is speech and intelligibility is between 25 and 70%.

Verbal Level 3: Primary mode of communication is speech and intelligibility is between 70 and 100%.

Reading Level 1: Less than 50% correctight word recognition at the pre-primer level.

Reading Level2: Sight word recognition score between the primer and grade 4 level.

Reading Level 3: Sight word recognition score at or above the Grade 5 level.

Each subject was administered items 1-15 and 16-30 of the Peabody Picture Vocabulary Test (PPVT),Revised edition,Forms L and M via live voice and synthesized speech in an abba design. A Votrax Personal Speech System interfaced with an Epson HX-20 personal computer was used to administer the synthesized speech portion of the test.

## II. Project Description (Continued)

A correlated T-test was performed to determine if a relationship existed between performance on the PPVT and mode of presentation. Separate 3x3 univariate analysis of variance (UANOVA) were performed on the score obtained on the PPVT 1)presented via live voice and 2) presented via synthesized speech.

## III. Major Findings/Results:

The following conclusions were drawn from the results of this study:

1. There was a decrease in auditory comprehension of single words when presented via synthesized speech as compared to live voice. This difference was significant ($p<.01$) for verbal nonreaders with speech intelligibility between 25 and 100%.

2. Level of reading ability had a significant effect on developmentally disabled adults'ability to comprehend single words produced by a text-to-speech synthesizer or by live voice.

3. Level of verbal ability did not have a statistically significant effect on developmentally disabled adults' ability to comprehend single words produced by a text-to-speech synthesizer or by live voice.

## IV. Written Manuscript/Summary Available ☒ Yes ☐ No

**From:**

Meredith Morgan
Speech Pathologist
UCPA Adult Services Program
Rochester, NY 14618

## UNPUBLISHED RESEARCH STUDIES UP

### IPCAS Study on Interaction

**Title of Research Study:** Blissymbol Communication: Comparison of Interaction with Naive vs. Experienced Listeners

**Principal Investigator(s):**

Debra Morningstar
Thistletown Regional Centre
51 Panorama Court, H-17
Rexdale, Ontario, CANADA
(1-416-741-1210, Ext. 317)

**Type of Research Project:** (Dissertation, Thesis, Independent Study, Funded)

Master's Project, University of Toronto

**Date Completed:** 1981

### I. Purpose(s) of the Research:

To investigate the communication strategies used by Blissymbolics users and familiar and unfamiliar partners in communication interaction. In particular, to examine the effectiveness of communication strategies in these exchanges.

### II. Project Description:

The study examined the communication interaction between four Blissymbolics users (age 15-21 years) and verbal partners, both staff members experienced in Blissymbolics and first year Psychology students unfamiliar with the system. All Blissymbolics users were developmentally disabled and used Blissymbolics as their primary means of communication. The four Blissymbol users varied in the technique used, rate of communication, specific system, and over-all physical ability. Eight familiar and eight non-familiar partners participated in the study. Each Blissymbol user interacted with four verbal partners (2 familiar; 2 unfamiliar) in four different communication contexts.

Communication contexts required the Blissymbol user to explain a movie or the rules of a card game to a verbal partner who had no information about them. The Blissymbolics users watched one of three movies (The Owl Who Married a Goose: an Eskimo Legend; What on Earth; or Child Safety is no Accident) or were given the description of the game. A communication partner was then brought into the room. The subsequent interactions were videotaped and audiotaped.

## II. Project Description (Continued)

Blissymbol use, hand gestures, head nods, and eye movements were recorded for the four non-speech communicators. The following communication behaviors were noted: rephrased utterances and repetitions of the recipient's questions or symbol user's propositions; the number of questions or comments said after a single symbol was indicated (interruptions) as opposed to the number given after the user's output was completed; and the number of content words and functions words indicated by the symbol user.

## III. Major Findings/Results:

1. Those unfamiliar with Blissymbols interrupted the user's message more often after one symbol, and repeated the symbols verbatim more often than they rephrased the message.
2. Persons familiar with Blissymbolics restrained from questioning or commenting until at least one phrase was complete. This group also repharsed more of the messages than repeated symbols verbatim.
3. Symbol users indicated more function words when communicating with with inexperienced receivers than with experienced receivers.
4. Rephrased questions resulted in greater amounts of output from symbol users than questions repeated.
5. There were many ideosyncratic differences between symbol users.

Additional observations: Blissymbol users shifted their communication strategies when communication difficulty occurred; unfamiliar persons tended to ignore or not recognize non-verbal modes of communication used. The author suggests some successful bidirectional strategies for interactions in which Blissymbols are used.

## IV. Written Manuscript/Summary Available ☒ Yes ☐ No

**From:**
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51 Panorama Court, H-17
Resdale, Ontario, CANADA

## UNPUBLISHED RESEARCH STUDIES UP

## IPCAS Study on Interaction

**Title of Research Study:**

Measures of the Intelligibility of the Handi-Voice HC 120 Speech Synthesizer

**Principal Investigator(s):**

Patricia P. Nielsen
Graduate Student
Speech Pathology and Audiology
California State University - Sacramento
(Under the direction of Colette Coleman, Ph.D.)

**Type of Research Project:** (Dissertation, Thesis, Independent Study, Funded)

Thesis

**Date Completed:** December, 1979

### 1. Purpose(s) of the Research:

To examine the intelligibility of words and words in sentences when presented through the Handi-Voice HC 120 speech synthesizer in quiet and in a +10 dB signal-to-noise environment using white noise.

### II. Project Description:

Thirty normal-hearing subjects who were unfamiliar with synthesized speech participated in the study. Listeners were presented with single words and words in sentences as stimuli and asked to write down what they heard. Stimuli was presented in quiet and in noise. The task was repeated twice at one-week intervals.

II. Project Description (Continued)

III. Major Findings/Results:

1. White noise at +10 dB signal-to-noise ratio significantly deteriorated the intelligibility of the Handi-Voice 120 in comparison to the no-noise (quiet) condition.

2. Performance of individuals on a single-word task is not related to their performance on a words-in-sentences task with stimuli presented through the HC 120.

3. Word-final phonemes were more often perceived correctly than word-initial phonemes.

4. Phoneme substitutions remained relatively stable throughout the experiment. Individual phonemes identified correctly most frequently were /n, d, s, r/. The two phonemes most frequently misidentified were cognates / θ, ð /.

(AWK)

IV. Written Manuscript/Summary Available ☒ Yes ☐ No

From:

Thesis microfilms

**Title of Research Study:** An Observational Analysis of Language Interactions in Speaking-Nonspeaking Dyads with Familiar and Unfamiliar Communicators

**Principal Investigator(s):**

Karen S. Sponseller and Pamela Laikko

**Type of Research Project:** (Dissertation, Thesis, Independent Study, Funded)

Master's Project, Department of Speech, Washington State University)
(Under the direction of Pamela Laikko)

**Date Completed:** 1983

1. **Purpose(s) of the Research:** To examine communication interaction between an augmentative communication system user and familiar and unfamiliar communication partners. Specifically, to note any significant differences that occur in symbol mode use, length of utterance, communication function, anc communication effect.

II. **Project Description:**

The study examined communication between a child of 11 years, 6 months and four familiar interactants (3 speech-language pathologists and 1 occupational therapist) and four college students in speech pathology with no previous contact with the user. The child communicated through a Canon Communicator (18 mo. of experience), vocalizations and a few single words. His receptive language score on the PPVT was 6 years, 8 months.

The conversational sample was obtained in a test room using three picture contexts for stimuli in open-ended conversation. Free-form watercolor drawings, and pictures from the Peabody Picture Kit and What's Wrong Here (Teaching Resources) were used for conversational stimuli. Interactants were insturcted to communicate with the child for 10 minutes in each of the three contexts. The 30 minute sessions were videotaped.

Five minutes from each picture stimuli context were analyzed for each dyad (a total of 15 minutes per each of 8 partners). Communication was coded using modified and integrated versions of the coding systems of Harris, Culp, Colquhon, and Wexler et al. This coding examined: Meta-Talk vs. Context, Type of Utterance, Pragmatic Function, Utterance Form, Mode, Length of Utternace, and Communication Effect (success). The familiar and unfamiliar interactants were analyzed as two groups. The nonspeakers behaviors were also analyzed.

II. Project Description (Continued)

III. Major Findings/Results:

The familiar and unfamiliar dyads demonstrated very few significant differences in the interaction. Significant differences were found in the use of encouragements and the successfulness of the interaction with the familiar partners. In general, the findings of earlier researchers were collaborated in terms of the speaking partner (both familiar and unfamiliar) controlling the communication situation and asking a large percentage of questions; the nonspeaker was predominately an responder. Non-verbal and vocal'verbal means of communication were used with a higher frequency than the communication aid. The aid appeared to be used when communication by these other means was difficult.

(AWK)

IV. Written Manuscript/Summary Available ☒ Yes ☐ No

From: Pamela Laikko
Department of Communication Disorders
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Madison, WI 53706

**Title of Research Study:** The Social-Verbal Competence of Non-Speaking Individuals

**Principal Investigator(s):**

Ann Colquhoun Sutton
59 Cliueden Avenue
Toronto, Ontario
Canada M87-3M9

**Type of Research Project:** (Dissertation, Thesis, Independent Study, Funded)

Independent

**Date Completed:** November, 1983

## I. Purpose(s) of the Research:

This study examined the performance of non-speaking individuals on a formal measure of social-verbal competence, the Let's Talk Inventory for Adolescents (Wiig, 1982). In particular, the study compared the overall performance of the non-speakers to norms established on able-bodied speakers, and further analyzed the structural features, attenuation devices and amplification used by the non-speakers in this elicited task.

## II. Project Description:

The subjects in this study were four physically disabled nonspeakers with cerebral palsy. Ages ranged from 18 years to 29 years, 11 months. All subjects used a direct selection augmentative communication board based on Blissymbolics. All had used Blisssymbols for 9 or more years, were judged to be skilled users, and had between 461 and 900 symbols available to them. All were independent in mobility. PPVT-R age equivalent scores for the subjects ranged from 8 years, 4 months to 11 years, 10 months.

All subjects were asked to estimate the number of people that they interacted with/week. Responses ranged from 15-50 partners. A speech-language pathologist familiar with the subjects was also asked to rank the nonspeakers as social communicators.

The Let's Talk Inventory for Adolescents (Wiig, 1982) was administered to all the subjects. The test examines 40 speech acts representing four different communicative functions. These functions include: (1) ritualizing (e.g., hello, farewell, introducing self; (2) informing e.g., yes/no questions, affirmation, denying, Wh questions; (3) controlling (e.g., requesting action, suggesting, permission, refusing); and, (4) feeling (e.g., endearment, approval, bragging, apologizing). The test examines speech acts and communicative functions in interaction with both peers and authority figures. Pictures of an adolescent interacting with a peer or authority

## II. Project Description (Continued)

figure and a verbal description of the situation are given. The subjects attempt to verbally depict what the adolescent in the situation might say.

The test data were coded (Wiig et al, 1983) and analyzed qualitatively and quantitatively. Responses were analyzed in reference to the norms for the test established on 7-14 year olds for over-all scores, syntactic structure, attenuation (i.e., softening of the speech act via semantic and/or syntactic devices which are more polite or less direct), and amplification (i.e., extra information accompanying and utterance which actually fulfills the speech act intent). The speech acts which were passed by two or fewer subjects, and those passed by three or more subjects were further analyzed.

## III. Major Findings/Results:

The subjects' performance suggests that these Blissymbolics users were more competent in social communication than might be expected from a previous study of communication board use with this population (Colquhoun, 1982). Subjects demonstrated the ability to express a variety of speech acts in this elicitation task.

In terms of overall scores in each communicative function and context (peer/authority), all subjects obtained scores equivalent to the 13-14 year old normal group for some speech acts/functions, as well as scattered scores at lower age levels suggesting varying levels of competence in different functions. As a group, the subjects were most successful in the informing function, followed by ritualizing and controlling. The feelings function appeared to be the most difficult for these subjects. It is suggested that this ranking may be a function of the training that has been provided to these speakers in the past, and the interaction styles that are frequently observed in this population.

The Blissymbol users employed a variety of syntactic structures to realize speech acts, usually structures which were found in one or more of the normal groups. They differed from the normal groups in that Name of Adressee was essentially absent in all communicative functions. In certain speech acts (e.g., farewells, availability, affirmative), structures which appear in a trade off pattern in the normal groups were found in the Blissymbol users' responses. In other speech acts (e.g., request to respect, offering choice), the Blissymbol users employed structures which occurred rarely or never in the normal groups.

Major Findings/Results (Continued)

The Blissymbol users attenuated speech acts less frequently than the norms and had a greater dependence on semantic (vs. syntactic) devices to accomplish this attenuation. All of the subjects demonstrated some ability to shift register between peer and authority. Use of amplification devices by this population was limited. It is suggested that some of these differences may be attributed to the augmentative systems themselves rather than competencies of the users per se.

Responses which failed to realize the speech act were usually related to the target responses (e.g., initiating conversations without saying "hello"). The speech acts that posed the most difficulty for the subjects were those that required more complex syntactic and/or conceptual structure (e.g., suggesting, promising, negotiating), or those that required a specific formula (e.g., introducing).

Success in the Let's Talk Inventory did not appear to be correlated with the number of symbols available to the subjects, years of Bliss use, PPVT scores, age, or the speech-language pathologist's expected performance ranking. The rank order of performance on the test correlated more closely with the subjects' self-estimates of the number of different conversational partners per week.

(AWK)

IV. Written Manuscript/Summary Available ☒ Yes ☐ No

From: Ann Colquhoun Sutton
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Toronto, Ontario, Canada M87-3M9

Manuscript submitted for publication.

## UNPUBLISHED RESEARCH STUDIES UP

### IPCAS Study on Interaction

**Title of Research Study:**

An Examination of Expressive Language in a Non-Speaking Adult

**Principal Investigator(s):**

K. Waldron, G. Gordon, and H. Shane

**Type of Research Project:** (Dissertation, Thesis, Independent Study, Funded)

Master's Thesis in Communication Disorders, Emerson College, Boston, Massachusetts (Under the direction of Howard Shane, Ph.D.).

**Date Completed:** 1980

### I. Purpose(s) of the Research:

This study examined (1) the writing skills of a 34 year old, developmentally disabled nonspeaker; and, (2) his communication interaction with a familiar and unfamiliar person, particularly in reference to the style used by the nonspeaker and partners, and the rate of exchange that occurred.

### II. Project Description:

The nonspeaker in this study was a 34 year old male with congenital, spastic cerebral palsy, who resided for the past 16 years in a home for the retarded. Until he was institutionalized, J. lived at home and received some education through a teacher for the home-bound. Until he was 16 years of age, communication was via vocalizations, pointing and a few gestures. At 16, a communication board was first introduced in preparation for his transfer to the institution. J's father constructed his boards. No formal training in communication use was provided.

At the time of this study, J. was communicating through a direct selection board (finger pointing) which contained the letters of the alphabet, prefixes, suffixes, and words. Communication was primarily through spelling. Pointing skills on this board were not easily interpretable to those not highly familiar with him. Language comprehension skills were judged to be normal through standardized tests and observations. The communication partners in this study were J's mother (familiar partner) and a speech pathology student who had no experience communicating with non-speaking persons (unfamiliar partner).

Task 1 - J. was asked to write an essay describing a typical day. Using an electric typewriter, this composition took J. approximately twelve hours/page (single spaced). The final essay was given to the chairman of a College English Department, who was asked to evaluate the English skills in a manner similar to that used for college entrance as prescribed by the Educational Testing Service.

## II. Project Description (Continued)

Task 2 - J. was shown a print of an impressionistic painting for 30 seconds. The picture was then removed, and he was asked to describe the painting to one of the two partners (familiar or unfamiliar) as effectively and as quickly as possible. Following the description, the listener was shown three prints and asked to select the one that had been described by J. The three prints displayed were balanced by time period, style, and artist. Three sets of paintings were used for the study.

## III. Major Findings/Results:

Task 1 was evaluated and judged to be comparable to the level of an entering Freshman in college in terms of punctuation, grammar, vocabulary, and clarity. The essay was also judged to be creative. This single case highlights the expressive language capabilities that are possible in a person who has never verbally spoken.

Task 2 - The style of the nonspeaker did not appear to change whether he was communicating with his mother or the unfamiliar partner in the picture description task. The non-speaker's utterances were all completely grammatical sentences. No efforts to increase the rate of communication by using telegraphic "speech" were noted. The partners differed, however, in the manner in which they interacted with J. The familiar partner used a great deal of prediction, guessing, and completion of spelling and phrases to which J. confirmed or denied with a head nod. The partner unfamiliar with J. initially used no acceleration techniques (word guesses or sentence completions) and noted J's selections verbatim. By the third picture set, she began to use some spelling prediction, completing a partially spelled word. The rate of communication exchange between J. and the familiar and unfamiliar partners was markedly different. Communication with the familiar partner was twice as fast as with the unfamiliar listener. This was primarily a function of prediction style on the part of the listener, and ease of reading J's motoric selections.

(AWK)

## IV. Written Manuscript/Summary Available ☒ Yes ☐ No

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## UNPUBLISHED RESEARCH STUDIES UP

### IPCAS Study on Interaction

**Title of Research Study:** Conversational Interaction of Nonspeaking Cerebral Palsied Individuals and Their Speaking Partners, With and Without Augmentative Communication Aids

**Principal Investigator(s):**
Karin B. Wexler, Ph.D. - Principal Investigator
Andrea F. Blau, M.S. - Co-Investigator
Susan P. Leslie, M.S. - Co-Investigator
John J. Dore, Ph.D. - Co-Investigator

**Type of Research Project:** (Dissertation, Thesis, Independent Study, Funded)

Funded by United Cerebral Palsy Research and Education Foundation, Inc. and Health Research, Inc.

**Date Completed:** 8/83

I. **Purpose(s) of the Research:**

1. To develop a valid and reliable system for analyzing the conversational functions of nonspeaking persons interacting with speaking partners.
2. To describe the conversational competence of nonspeaking (and speaking) persons in terms of initiations of sequences, complex acts, variety of functions of conversational acts, etc.
3. To compare conversational competence of nonspeaking persons in two situations: With and without communication aids (i.e., alphabet/word boards).

II. **Project Description:** For development of a system of analysis for conversational functions of nonspeaking persons, a series of videotapes was made of ten pairs of nonspeaking (cerebral palsied) and speaking persons conversing on prepared topics for 10-minute periods with and without augmentative communication aids (nonelectronic alphabet/word boards). Procedures for describing and analyzing the conversational contributions of both nonspeaking and speaking populations, both with and without augmentative communication aids, were developed. A taxonomy of conversational acts in sequences was provided. How nonspeaking and speaking conversational partners differ from one another in terms of conversational functions was described (with and without use of aids) based on the system of analysis, and how nonspeaking persons' conversational functions are affected by use of such an augmentative communication aids was assessed.

Final report includes e.g., definitions of terms; criteria for determining interpretability of communicative behaviors; transcriptional notations; variables used in system of analysis (e.g., guidelines for coding initiations, and complexity of conversational act types); whole and composite conversational acts (including definitions of beginning and end of component sequence).

II. Project Description (Continued)

III. Major Findings/Results:

It was found that nonspeakers' range of communication competencies greatly increased with the use of the augmentative aid, e.g., their production of more complex statements, answers, and acknowlegements, as well as their proportion of initiations of conversational sequences. Furthermore, the use of an aid shifted more control of the conversations to the nonspeaking person. The relationship between this system of analysis of conversation and other systems proposed was discussed. The system used here reveals a wider range of communicative competence of nonspeaking persons than has heretofore been documented. Implications for clinical intervention are discussed and directions for future research are suggested.

IV. Final Report ~~Written Manuscript/Summary~~ Available ☒ Yes ☐ No

From: Karin B. Wexler, Ph.D.
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West Haverstraw, NY 10993

## UNPUBLISHED RESEARCH STUDIES UP

### IPCAS Study on Interaction

**Title of Research Study:** Assessing pragmatic abilities in a multi-handicapped child

**Principal Investigator(s):**

Sharon Wieder
Renee Kornet
Communication Arts and Sciences
Queens College - City University of New York
Flushing, New York 11367
(212) 255-7358

**Type of Research Project:** (Dissertation, Thesis, Independent Study, Funded)

Master's Thesis - Experimental Study

**Date Completed:** June, 1983

### I. Purpose(s) of the Research:

The present study investigated the pragmatic abilities of a multi-handicapped child. The purpose of this study was to assess the range of communicative function expressed as a function of co-participant (clinician vs. mother vs. sibling) and with respect to varying contexts. In addition, the specific linguistic/nonlinguistic devices used by the child were examined.

### II. Project Description:

The subject B. was an ambulatory, 10.10 year old speech and language impaired child. B. was diagnosed as exhibiting mild cerebral palsy with oral apraxia and a moderate degree of dysarthria. B. also exhibited severe deficits in expressive and receptive language development. Communication was primarily through natural gestures, facial expressions, and one and two word utterances of varying intelligibility.

B. was videotaped during interactions with his mother, sister, and clinician in various contexts: manipulative play, picture/reading, and snack time. These sessions were transcribed using Bloom and Lahey (1978) and included verbal and non-verbal aspects of the interaction (e.g., eye gaze, intonation, gesture). The videotaped samples were analyzed using Wollner and Geller (1981) to determine the communicative functions and specific communicative acts that were used in each interaction and in each context. The child's communicative interactions were examined with respect to the following questions: (1) What was the range and distribution of communicative functions exhibited by the subject? 2) Did the communicative functions expressed vary with respect to co-participant? 3) Did the communicative functions expressed vary with respect to activity context? 4) Were specific linguistic/nonlinguistic devices used to convey particular functions? and, 5) Did the devices used vary with respect to co-participant?

II. Project Description (Continued)

III. Major Findings/Results:

1. The subject used a variety of communicative acts across partners and contexts. The frequency of specific communicative acts varied across contexts, with the least occurring in the snack context. The manipulation context resulted in a larger number of requests; the snack context produced more performatives. Responding behaviors were frequent across contexts and partners.

2. Gestures were used with greatest frequency irrespective of conversational partner/context. Other non-linguistic forms of communication were also used (e.g., body orientation, vocalization, facial expression, eye gaze). The highest use of speech occurred with his mother; however, gesture use remained the most frequent mode of communication with this partner as well. A high percentage of the linguistic (verbal) responses were yes/no utterances.

3. Certain modes of communication were used with greater frequency with particular functions. For example, vocalization was frequently used for the clarification function; gesture for the response function and gaze for requesting. However, specific devices were not tied to a specific communicative function.

4. Communication partners used separate and distinct styles when conversing with B. The sister and clinician often commented on actions and utterances of B. This resulted in greater use of comments by B and fewer responses. The mother rarely commented on B's actions and utterances. B. appeared to be sensitive to variations in co-participants and contexts.

The authors suggest that a composite profile of the linguistic and nonlinguistic devices naturally used by a person to communicate intentions with a variety of people in a variety of contexts be compiled for a person needing an augmentative communication device. With an understanding of the devices naturally used and their successfulness in particular settings, the linguistic content and functions needed in the communication device can then be outlined. Duplication need not occur and the communication needs of the child can better be met.

(AWK)

IV. Written Manuscript/Summary Available ☒ Yes ☐ No

From: Renee Kornet
Queens College Speech and Hearing Center
Queens College - CUNY
Flushing, NY 11367

## APPENDIX B

## IN-PROGRESS RESEARCH STUDIES (IP)

Barker, M. and Henderson, J. Using computers to teach communication skills to severely physically and speech impaired cerebral palsied children, Rehabilitation Engineering Center, Stanford University, Palo Alto, CA.

Blackstone, S. and Cassatt, E. L. Interaction skills in children who use communication aids, John F. Kennedy Institute, Baltimore, MD.

Blau, A. Communication in the back-channel: The organization of repair in nonspeech/speech conversations, Doctoral Dissertation, City University of New York, New York, NY.

Christopulos, K. and Shane, H. A study of speech interpretation in twin males with cerebral palsy - A pilot study, Master's thesis, Emerson College, Boston, MA.

Farrier, L., Yorkston, K., Beukelman, D. and Marriner, N. Conversational control in normal speakers using an augmentative communication system, Master's Thesis, University of Montana, Missoula, MT.

Galyas, K. and Lundman, M. Evaluation of synthetic speech as an aid for communication, education, and training, Swedish Institute for the Handicapped, Bromma, Sweden.

James, J. M. An analysis of the spontaneous blissymbolic utterances of 10 cerebral palsied children of average intellect, Doctoral Dissertation, Cardiff, Wales

Kraat, A. and Levinson, E. Intelligibility of two speech synthesizers used in augmentative communication devices for the severely speech-impaired, Queens College, CUNY, Flushing, NY.

Light, J. Communicative interaction involving young nonspeaking physically handicapped children and their primary caregivers: An analysis of discourse links, communicative intent and mode of communication, Master's Thesis, Special Education, University of Toronto, Toronto, Ontario, Canada, May, 1983.

Marriner, N. The effect of partner question types on the control, efficiency and comfort of nonspeech communication, Doctoral Dissertation, University of Washington, Seattle, WA.

Ratcliff, A. An attempt to reliably define communication breakdowns in nonspeaking/speaking dyads, Master's Thesis, University of Wisconsin, Madison, WI.

Udwin, O.Y. An evaluation of nonspeech communication modes taught to cerebral palsied children, Doctoral Dissertation, Institute of Psychiatry, London, England.

Wieck, K. Comprehension of synthesized speech by preschool children, Master's Thesis, California State University, Sacramento, CA.

Yorkston, K., Beukelman, D. and Marriner, N. Assessment of communication needs of nonspeaking individuals: Phase I development of quantification techniques, University of Washington, Seattle, WA.

**RESEARCH IN PROGRESS - SUMMARY REPORT** **IP**

**IPCAS Study on Interaction**

**Title of Project:** Using Computers to Teach Communication Skills to Severely Physically and Speech Impaired Cerebral Palsied Students

**Principal Investigator(s):** (Affiliation, Address, Telephone)

Margaret R. Barker
Juliet Henderson
Rehabilitation Engineering Center
Childrens Hospital at Stanford
520 Willow Road
Palo Alto, CA 94304 (415) 327-4800

**Type of Research Project:** (Dissertation, Independent Study, Funded Research, Thesis)

Research funded by United Cerebral Palsy Research and Educational Foundation, Inc., Grant Number 348-84.

**Starting Date:** April, 1984 **Expected Completion Date:** April, 1985

## 1. Purpose(s) of the Research Project:

This research study explores the effectiveness of using specific computer programs and intervention procedures to increase the communicative interaction skills of severely physically and speech impaired students in a school environment. In particular, the study addresses the development of five communicative interaction skills: 1) greeting and initiation of conversation; 2) termination of conversation; 3) maintenance of listener's attention; 4) clarification of messages; and, 5) appropriate interruptive skills in conversation.

## II. Project Description: (Subjects, Methodology; Analysis)

Nine subjects were selected for the study. These students reside in various integrated classroom settings, have an augmentative communication system available to them, demonstrate deficits in the communication skills under study, and have at least a six year level of language comprehension.

Interaction samples were collected and videotaped for each subject in three contexts: entering the classroom in the morning, participating in a group learning situation, and constructing a collaborative story board with an able-bodied peer. These video samples were analyzed through an interactive checklist, and specific intervention goals were identified for each child. Simultaneously several commercially available software programs were reviewed as training mediums for the interaction skills under study.

An intervention plan will be designed for each subject centered around software programs which can address communicative interaction skills. Following a three month period of intervention (including 3 hours of computer use per week), the subjects will be reevaluated in the three contexts initially observed for the study baseline.

**RESEARCH IN PROGRESS** **IP**

II. **Description** (Continued)

III. **Status of Project 5/84**: Subjects have been selected and baseline measures obtained. Specific communication intervention goals have been outlined for each subject and existing computer software evaluated regarding its usefulness in teaching specific interaction skills. During the baseline measures, it was noted that poor performance was due not only to children's lack of interaction skills. Access to potentially effective vocabulary contributed to poor communication. Consequently, the communication systems as well as access to computers is being addressed over the summer prior to any intervention procedures being introduced. Specific intervention planning for each child is in progress.

IV. **Preliminary Findings/Comments:**

(Signature)

May, 1984
(Date)

# RESEARCH IN PROGRESS - SUMMARY REPORT

IP

## IPCAS Study on Interaction

**Title of Project:** Interaction Skills in Children Who Use Communication Aids

**Principal Investigator(s):** (Affiliation, Address, Telephone)

Sally W. Blackstone
E. Lucinda Cassatt
Speech and Hearing
John F. Kennedy Institute
707 N. Broadway
Baltimore, MD 21205 (301) 522-5450

**Type of Research Project:** (Dissertation, Independent Study, Funded Research, Thesis)

Clinical

**Starting Date:** August, 1983

**Expected Completion Date:**

### 1. Purpose(s) of the Research Project:

To analyze the communication acts and interaction skills in children with cerebral palsy who use communication aids.

### II. Project Description: (Subjects, Methodology; Analysis)

Subjects: 15 children with cerebral palsy and their mothers participated. All are followed on a regular basis at the John F. Kennedy Institute in Baltimore, Maryland.

Sex: Nine (9) females and six (6) males
Ages: 3 to 20 years
Cognitive I.Q.: average to moderate mental retardation
Language: 2-2½ to 14 years (receptive language levels)
Speech: severe speech motor dysfunction
Intelligibility: 0-50% unknown context with a familiar listener
*Aides/system: E-Tran - 7
Language Boards - 6
Zygo - 100 system - 1
Express III - 2
Morse Code System (University of Washington) - 1
Manual Signs - 2
Speech - 6

Procedures: Each child was videotaped for later analysis in three contexts. The contexts were:

1. Familiar-routinized: Mother was instructed to engage in familiar routine with the child for 5 minutes.
2. Unfamiliar-non-routinized: Picnic script with experimenter and child.
3. Unfamiliar-routinized: Snack script with experimenter and child. Mother was present to feed the child. (See Appendix for script example.)

## II. Description (Continued)

Analysis: A discourse analysis system, (Cassatt and Blackstone, 1983), adapted from Dore (1977), was utilized to code the mother/child communication behaviors in context #1 and the child's communication behaviors in contexts # 2 and #3.

A variety of communication acts were coded, which included the use of the aid/system, speech, head nods and shakes, smiles, gestures and formal signs. Nonverbal behaviors were operationally defined. For example, a laugh was defined as "a vocal laugh or a smile that lasted more than 5 seconds", since some children were unable to produce a vocal laugh.

Analysis of the data yielded reliability of between 70% and 90% agreement on the turn-types and communicative intentions expressed. These data were quantified for each context using a summary analysis form.

* Several children used more than one system.

## III. Status of Project 1/84:

## IV. Preliminary Findings/Comments:

A statistical analysis has not been completed at this time. The authors intend to change the coding categories and will re-analyze the results accordingly. The preliminary analyses revealed the following trends in the data:

1. Children:
    a. Use of the communication system ranged from 0% to 80% of the communication acts engaged in by these children.
    b. All children used all communicative functions.
    c. Most turn-types were responses. Few children initiated communication. Irrelevant responses, unintelligible and no response categories occurred most often during the picnic script with children who were functioning at less than the 3 year level.
2. Mothers:
    a. The majority of their utterances (60%) were requests.
    b. The greatest proportion of parent's responses were conversational devices (75%). Most were returns/turn markers and repetitions.

Preliminary Findings (Continued)

Discussion: Our preliminary data suggest that communication occurs through a variety of channels, not just through the formal system which we are providing the child. These differences depended on the context as well as on the individual child. Use of the formal system ranged from 0 to 86% during the picnic activity and from 50 to 64% during the snack activity. There was not even consistency in an individual child's use. For example, one child used her system 39% of the time during a picnic activity and 9% during a snack activity.

All children used a variety of communicative functions. This did not directly correlate with I.Q. or mental age. These findings are in contrast to previously reported information and probably reflect the variety of communication behaviors coded in this study. Previous studies suggested that the intentions expressed by children using augmentative systems were restricted. However, these studies did not look at other communication behaviors.

In view of these trends in the data, it is apparent that our goal in working with children who use augmentative systems should not be training the use of the system but rather fostering the use of communication strategies. Communication aids should be considered just that . . . as aids to supplement communication. Our work should turn towards fostering the development and understanding of what enhances communication and how we and others, who work with communicatively impaired individuals, can optimize their environment to facilitate expression.

S. W. Blackstone Ph.D.
(Signature)

2-20-84
(Date)

## RESEARCH IN PROGRESS - SUMMARY REPORT

IP

### IPCAS Study on Interaction

**Title of Project:** COMMUNICATION IN THE BACK-CHANNEL:
The Organization of Repair in Nonspeech/Speech Conversations

**Principal Investigator(s):** (Affiliation, Address, Telephone)

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Graduate School & University Center - City University of New York
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New York, New York 10036
(212) 796-5890 (home) (212) 790-4366 (department)

**Type of Research Project:** (Dissertation, Independent Study, Funded Research, Thesis)

Dissertation

| **Starting Date:** | **Expected Completion Date:** |
|---|---|
| September 1st, 1982 | September 1st, 1984 |

1. **Purpose(s) of the Research Project:**

1. To refine the definition of communicative competence to include a cross-person measure reflecting how meaning is generated and shared between people.
2. To describe the back-channel communications (and the extended sequences of conversational repair) which predominate the conversations of many nonspeaking/speaking dyads.
3. To develop a theoretical model and a clinical measure for examining the negotiation of meaning between nonspeaking and speaking conversational partners.

II. **Project Description:** (Subjects, Methodology; Analysis)

Subjects: Eight nonspeaking individuals and eight speaking individuals were selected as subjects. The nonspeaking subjects were severely speech impaired due to neuromuscular incoordination associated with cerebral palsy. They were all nonambulatory, had normal hearing, and were considered to be of normal intelligence. They all used direct-select alphabet/word boards to augment their residual vocal and nonverbal communication attempts. Four subjects used their fingers for direct selection and four used a headstick. The age range was 15-28 years.

Eight speaking individuals who were familiar with the nonspeakers and their communication systems also served as subjects. Each speaker was professionally emplyed within the school, center, or hospital which the nonspeaking subject attended. These eight nonspeaking and speaking subjects served as the eight dyads for the study.

Methodology: Data was collected through videotaped recordings of each nonspeaking/speaking dyad during conversational interaction. Two ten minute periods (one in which the communication aid was available to the nonspeaker and one in which no communication aid was available) were videorecorded. The focus of the interaction was on conversation. The nonspeakers were instructed prior to the session to prepare four topics for discussion. No additional instructions were presented to the speaking partners. A warm up period was included prior to videorecording to acclamate the subjects to the task. The two conditions (with and without communication aids) were presented in counterbalanced order. The data was transcribed following the interaction. Two transcripts were produced for each dyad; one reflecting conversational interaction when the alphabet/word board was available to the nonspeaker and a second transcript for the unaided condition. The transcriptional format

II. Description (Continued)

allowed for the documentation of vocal and nonvocal verbal behaviors, as well as, vocal and nonvocal nonverbal behaviors. Actions which accompanied utterances (nonlinguistic context) were written in parentheses next to the utterance using transcriptional procedures described by Bloom & Lahey, 1978. Transcriptional reliability measures of 96% were obtained prior to coding.

Coding: The coding schemes as designed by the investigator were developed through extensive literature review and careful examination of the data. Four coding schemes were developed (only the first is available for dissemination at this time). Coding scheme #1 describes back-channel communication signals and describes the six distinct categories of signals used by the nonspeaking/speaking dyads (see appendix). Coding scheme #2 was developed to describe "hyperexplanation", a phenomenon in which a conversational partner persists twice or more within the same speaking turn at the same explanation point, prior to their partner's attempt at responding to or acknowledging the initial conversational act. The third and fourth coding schemes were developed for conversational repair analyses. The first provides a framework for looking at the interactional domain of conversational repair (i.e., the relationship of the trouble source element, repair initiation, repair attempt, and repair outcome.) The second looks at the organization of repair in terms of its internal organization, revealing how the form of the listeners repair initiation determines the response options available to the prior speaker and specifically, which revision strategies are used most frequently by the nonspeaking/speaking subjects.

III. Status of Project 1/84:

As of 1/84 the back-channel coding and analyses have been completed and the model of nonspeech/speech conversational interaction (in terms of the co-construction of the nonspeakers' messages by the nonspeaking/speaking dyads) has been completed. The analyses of hyperexplanation (typically used when the speaking partners fill in gaps in the conversations with extraneous talk) and conversational repair, are presently being completed. The study will be finished during the summer of 1984 and the findings made public.

IV. Preliminary Findings/Comments:

No findings can be reported at this date. Copies of the four coding schemes will be available as of September 1, 1984 and can be obtained from the author. The back-channel coding scheme which is included in this report is protected under copyright and is subject to revision prior to September. The author does, however, welcome its use by researchers and clinicians, provided it is referenced appropriately. The author also welcomes comments from all individuals who use it.

The videotapes of the eight nonspeaking/speaking dyads were initially used by the author in collaboration with Karin Wexler, John Dore, and Sue Leslie at Helen Hayes Hospital in a project funded through grants from United Cerebral Palsy Research & Educational Foundation, Inc. and Health Research, Inc.

Andrea J. Blau
(Signature)

2/25/84
(Date)

## RESEARCH IN PROGRESS - SUMMARY REPORT  IP

### IPCAS Study on Interaction

**Title of Project:** A Study of Speech Interpretation in Twin Males with Cerebral Palsy - A Pilot Study

**Principal Investigator(s):** (Affiliation, Address, Telephone)

Kanella Christopulos
Howard Shane, Ph.D.
Speech Pathology and Audiology
Childrens Hospital Medical Center
300 Longwood Avenue
Boston, MA 02115 (617) 735-6466

**Type of Research Project:** (Dissertation, Independent Study, Funded Research, Thesis)

Master's Thesis, Communication Disorders, Emerson College, Boston, Massachusetts (under the direction of Howard Shane).

**Starting Date:** Fall, 1983 **Expected Completion Date:** Fall, 1984

### 1. Purpose(s) of the Research Project:

To explore the ability of various communication partners to accurately interpret the severely impaired speech of a 7½ year old twin.

### II. Project Description: (Subjects, Methodology; Analysis)

The subjects in this pilot study were two twin boys with cerebral palsy, their mother, and an unfamiliar listener (graduate student in speech-language pathology). Prior to this study, the mother reported that the boys understood each other better than she or others; there is a question as to whether or not the communication involves ideoglossia (a twin language of their own), severe dysarthria, or a combination of both.

The 7½ year old twins differ in their physical abilities, and speech and language skills. The twin under study as a speaker-communicator was the more severely impaired of the two. He is non-ambulatory, and has receptive language skills estimated to be at the 3 year old level. His current means of expression is primarily through gesture and some single words. His twin brother is ambulatory, verbal, and has receptive skills estimated at the 5 year old level.

A barrier was placed between the more severely impaired twin and a listener. The barrier allowed the partners to observe the facial expressions and oral-motor movements of the speaker. The twin was asked to verbally label one of ten objects. The receiving partner was asked to identify the verbal attempt from an array of ten objects.

**RESEARCH IN PROGRESS** IP

## II. Description (Continued)

## III. Status of Project 1/84:

Pilot of research design; preliminary results.

## IV. Preliminary Findings/Comments:

To date, the twin brother appears to be the best interpreter of his twin's speech. The mother is less adept than the twin. The unfamiliar listener was the poorest.

(AWK)

(Signature)

(Date)

## RESEARCH IN PROGRESS - SUMMARY REPORT

IP

### IPCAS Study on Interaction

**Title of Project:** Conversational Control in Normal Speakers Using an Augmentative Communication System

**Principal Investigator(s):** (Affiliation, Address, Telephone)

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Kathryn M. Yorkston, Dept. of Rehab. Med. RJ-30, U. of Washington, Seattle, WA 98195
David R. Beukelman, Dept. of Rehab. Med. RJ-30, U. of Washington, Seattle, WA 98195
Nola Marriner, Dept. of Speech & Hearing Science JG-15, U. of Washington, Seattle, WA 98195.

**Type of Research Project:** (Dissertation, Independent Study, Funded Research, Thesis)

Professional paper-in-lieu of masters thesis, in partial fulfillment of M.A. degree University of Montana, Missoula, MT (in affiliation with Dept. of Rehab. Med., University of Washington.)

**Starting Date:** 9/83

**Expected Completion Date:** 4/84

**1. Purpose(s) of the Research Project:**

To investigate the effects of augmentative communication system use on the conversational control of normal speakers.

**II. Project Description:** (Subjects, Methodology; Analysis)

Subjects: Five pairs of non-impaired speakers participated in this project. Members of each pair were well acquainted with one another and were selected to be matched with their partners in terms of age, educational level and socio-economic background. The pairs ranged in age from 15 to 26 years. None of the subjects reported a history of communication problems. One member of each pair was randomly designated as the subject and the other as the communication partner.

Tasks: (1) Direction-Giving: Subjects were instructed to give the communication partners directions for reproducing a geometric design that was visible to the subjects but not to the communication partners. No restrictions were placed on the interaction other than that the partner could not look at the subject's design. In this task all of the information was provided to the subject.

(2) Decision-Making: The general format of this task was a game in which cards were bought and sold in order to accumulate a specific number of points. Both the subject and the communication partner had a portion but not all of the information needed to make decisions about buying or selling. They were asked to share as equally as possible in the decision-making.

Conditions:

(1) Speaking Condition: Both the subject and the communication partner were allowed to communicate normally with speech and gestures while performing the tasks.

(2) Non-speaking Condition: Subjects were restricted to the use of an augmentative communication system (an Expanded Keyboard Memo-writer). Prior to the experimental tasks, subjects were provided with a 10-15 minute training session consisting of demonstration and practice with the system. Subjects were told that they may not speak but that they may gesturally indicate "yes" and "no".

## II. Description (Continued)

Video-recording: Four video-taped segments of interaction were obtained for each pair. The order of task presentation was randomized and the conditions were counterbalanced. All samples were at least 10 minutes long AND contained at least 30 exchanges of communication turn.

Analysis: Sequences of 25 turns were selected from the mid-portion of each of the video-taped segments. Samples were transcribed according to the conventions developed by Miller and Chapman (1983) in the SYSTEMATIC ANALYSIS OF LANGUAGE TRANSCRIPTS (SALT). Using this computerized analysis technique, frequency data were obtained on the following measures for both subjects and communication partners: (1) total number of utterances, (2) total number of words, (3) a distribution of number of words per utterance and number of utterances per turn, and (4) frequency of word usage. Supplemental to the standard SALT analyses, each turn was coded for conversational control using a system adapted from McKirdy and Blank (1982). Using this system, each turn was coded as either an initiation or a response. Initiations were further coded as obliges (requiring a mandatory response) or comments (not requiring a response). Responses were coded for adequacy and for instances in which the responder became the initiator (recode). Rate measures obtained included the length of a 25 turn sample in minutes and mean typing rates for subjects using the augmentative system.

## III. Status of Project 1/84:

Results have been obtained and compiled. Project is expected to be completed by 4/84.

## IV. Preliminary Findings/Comments:

Preliminary results suggest different patterns of control are obtained from the direction giving and the decision making tasks when the subjects are speaking. The decision making task appears to allow equal opportunity to control the interaction; while the direction giving task provides more control for the speaking subject. When subjects are restricted to use of the augmentation system, their conversational control appears to be extremely limited.

(Signature)

(Date)

## RESEARCH IN PROGRESS - SUMMARY REPORT

IP

### IPCAS Study on Interaction

**Title of Project:** Evaluation of Synthetic Speech As an Aid for Communication, Education, and Training

**Principal Investigator(s):** (Affiliation, Address, Telephone)

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FACK
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Sweden

Margita Lundman
Per Wallner
Swedish Institute for the Handicapped
Box 303/S-161 26
Bromma, Sweden

**Type of Research Project:** (Dissertation, Independent Study, Funded Research, Thesis)

Government Funding

**Starting Date:** November, 1983

**Expected Completion Date:** May, 1984

### I. Purpose(s) of the Research Project:

To evaluate the use of synthetic speech in portable text to speech aids and BlissTalk in communication, education, and training environments.

### II. Project Description: (Subjects, Methodology; Analysis)

Fifteen synthetic speech aids have been placed with a variety of users in several environmental settings. Ten of these systems are portable text to speech units using the Epson HX20 as a basis. Of these systems, five have been placed with nonspeakers as personal communication aids. This group of nonspeakers includes two adolescents (age 16 and 21), and three adults who vary in type of disability, the interface technique used, abilities, and speaking environments. The remaining speech output units (both text to speech and BlissTalk) have been assigned to schools for education and training purposes. These devices are being used with normal pre-reading and writing children, nonspeakers, and an autistic child. Training was provided to all personal users and the professionals assigned to implement aid use.

Evaluation of these devices will be conducted by the Swedish Institute for the Handicapped and the Royal Institute for Technology (FACK). Evaluation procedures will include interviews of users and significant others in the environment, and use of the IPCAS aid evaluation forms for users and clinicians.

## RESEARCH IN PROGRESS

IP ______

II. Description (Continued)

III. Status of Project 1/84:

All aids have been placed in field evaluation assignments.

(AWK)

IV. Preliminary Findings/Comments:

Pending.

______ (Signature) ______ (Date)

## RESEARCH IN PROGRESS - SUMMARY REPORT

IP

### IPCAS Study on Interaction

**Title of Project:** An Analysis of the Spontaneous Blissymbolic Utterances of 10 Cerebral Palsied Children of Average Intellect

**Principal Investigator(s):** (Affiliation, Address, Telephone)

J. M. James
40, Lowerdale Drive
Llantrisant
Pontyclun
Midglam
South Wales - U.K.

**Type of Research Project:** (Dissertation, Independent Study, Funded Research, Thesis)

Dissertation

**Starting Date:** September, 1983

**Expected Completion Date:** April, 1984

### I. Purpose(s) of the Research Project:

To analyze spontaneous Blissymbolic messages, collected over a period of four years, with a view to providing a core vocabulary for children of average intellect based on usage. The children in the study are cerebral palsied and aged between 10 and 16 and all use the 400 symbol display. All have been assessed as knowing over 300 symbols.

### II. Project Description: (Subjects, Methodology; Analysis)

Since January 1979 symbol profiles have been kept on children using Blissymbols. Symbol profiles illustrate the child's symbol facility or responsive communication and symbol usage or spontaneous communication. Symbol usage does not indicate frequency of use but illustrates that a child has used the symbol in spontaneous communication. Spontaneous messages have been recorded using a standardized coding system and these messages form the raw data of the study. The standardized coding system was that a) only the word under the symbol indicated was recorded, b) anything spelled was written in capitals, and c) anything guessed or inferred was bracketed.

822 symbol messages have been analyzed containing 11,814 symbols. A frequency count has been made of every symbol used. A further frequency count has been made of symbols/words which are not available on the 400 display which the children needed access to.

Symbols have been arranged alphabetically in 11 tables. The tables indicate each child's individual frequency of usage of a symbol and total symbol usage in the study. Table 1 illustrates symbols used by all ten children in the study and Table 10 illustrates symbols used by only one child in the study. Table 11 isolates the symbols which were not used at all in the data analyzed.

**RESEARCH IN PROGRESS** IP

II. **Description** (Continued)

III. **Status of Project 1/84:**

Data has been analyzed and result tables are available. The results have not yet been written up.

IV. **Preliminary Findings/Comments:**

215 symbols have been isolated as a suggested core vocabulary. Not all the 215 symbols are available on the present 400 display. The researcher intends presenting the 215 symbols on a blank 400 chart. The spaces then available can be utilized for the child's personal vocabulary.

(Signature)

[illegible]
(Date)

## RESEARCH IN PROGRESS - SUMMARY REPORT

IP ____________

### IPCAS Study on Interaction

**Title of Project:** Intelligibility of Two Speech Synthesizers Used in Augmentative Communication Devices for the Severely Speech-Impaired

**Principal Investigator(s):** (Affiliation, Address, Telephone)

Arlene Kraat and Elizabeth Levinsen
Communication Arts and Sciences
Queens College - City University of New York
Flushing, NY 11367
(212) 520-7358

**Type of Research Project:** (Dissertation, Independent Study, Funded Research, Thesis)

Independent Study

**Starting Date:** July, 1983

**Expected Completion Date:** September, 1984

## I. Purpose(s) of the Research Project:

To compare two commonly used speech synthesizers, the Echo II and the Votrax Personal Speech System, in regard to: (1) intelligibility measures at the sentence level; (2) the relative effects of pause time on that intelligibility; and, (3) the number of altered spellings required by the user for frequently used words in each text to speech system.

## II. Project Description: (Subjects, Methodology; Analysis)

In the sentence intelligibility tasks, 64 sentences from the Assessment of Intelligibility of Dysarthric Speech (Yorkston and Beukelman, 1981) were presented to twenty adult listeners. These sentences were randomly selected from the eight word sentences in the battery. Sixteen sentences were assigned to each of four conditions: Votrax without additional pauses, Votrax with pause condition, Echo without additional pauses, and Echo with pause condition. The pause condition placed a 2½ second pause after each word in the eight word sentence.

Sentences were presented in quiet, free field conditions directly from the Apple II computer. Regular orthography was used for the stimulus sentences unless it added or deleted a syllable, or changed the vowel to another recognizable vowel. Listeners were instructed to guess and write down what they heard. Intelligibility measures utilized the percentage of correct words identified/sentence. Intelligibility scores are compared between synthesizers, and in relation to pause/no pause conditions.

Both synthesizers were also compared in relation to the requirements for altered spellings. Using the same criterion as above, both text to speech systems were compared regarding the number of alterations that are required of the user for a corpus of frequently used words. Judgements were made by 10 listeners on the Thorndike and Lorge (1944) frequency count for the most common 1000 words and the 500 most frequently used words by adult Canon users (Beukelman, 1982). The percentage of words needing alteration in the Voltrax and Echo systems were compared.

II. Description (Continued)

III. Status of Project 1/84:

IV. Preliminary Findings/Comments:

Although data is incomplete, the preliminary findings suggest that pause has an effect, particularly on the Echo II system, and the syntehsizers vary with regard to intelligibility. These two systems also differ in the number of re-spellings required of the system user.

Arline Kraat
(Signature)

April, 1984
(Date)

## RESEARCH IN PROGRESS - SUMMARY REPORT

IP

### IPCAS Study on Interaction

**Title of Project:** Communicative interaction involving young nonspeaking physically handicapped children and their primary caregivers; an analysis of discourse links, communicative intent and mode of communication

**Principal Investigator(s):** (Affiliation, Address, Telephone)

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Ontario Crippled Children's Centre
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(416) 424-3805

**Type of Research Project:** (Dissertation, Independent Study, Funded Research, Thesis)

Thesis, University of Toronto

**Starting Date:** May, 1983

**Expected Completion Date:** April, 1984

1. **Purpose(s) of the Research Project:** The goals of the project are as follows: (1) To provide a detailed analysis of communicative interaction involving congenitally nonspeaking, physically handicapped children (ages 4-6) and their primary caregivers; (2) to compare the patterns of interaction in those dyads in which the children use direct selection to access their communication boards with the patterns in those dyads in which the children use indirect selection; and (3) to develop a set of play contexts for use by clinicians to elicit a range of communicative intents from nonspeaking handicapped children.

II. **Project Description:** (Subjects, Methodology; Analysis)

A sample of eight dyads was selected, composed of congenitally nonspeaking, physically handicapped children (between the ages of 4 and 6) and their primary caregivers. (In five dyads, the principal caregiver was the birth mother; in two dyads, a foster mother fulfilled the role; and in one dyad, an older sister with extensive after-school and weekend babysitting responsibilities was identified as the primary caregiver). Seven of the children had diagnosis of cerebral palsy, while the eighth child had a diagnosis of Lesch-Nyhan syndrome. None of the children had diagnoses of mental retardation, hearing impairment, or severe visual impairment. All of the children were involved in a school program and all were receiving services from the Augmentative Communication Service at the Ontario Crippled Children's Centre, Toronto, Canada. Seven of the children were using Blissymbols as an augmentative communication system, while the eighth child had a combination of Blissymbols and pictures. The children had been using the above systems for at least 9 months prior to the research and had acquired a vocabulary of at least 100 symbols. Half of the children used direct selection techniques (finger or thumb pointing) to access their communication boards, while the remaining children used indirect selection (eye gaze or fist point to a block of symbols, followed by eye gaze or point to a colour or number to indicate a specific symbol choice within the block).

The children were videotaped in an unstructured free play situation with their primary caregivers in a play room at the Ontario Crippled Children's Center. The following toys were available for the twenty minute play session: a doll house, furniture, a family of dolls, a Fisher Price garage, cars, trucks, and a bus. All caregivers reported that the videotaped interactions were

## II. Description (Continued)

representative of their own and of their children's typical communication and behaviour.

A series of play contexts were developed based on the work of Snyder (1978), Dale (1980), Creaghead et al (1980), and Creaghead (1982). These play contexts were developed to elicit a full range of communicative acts from the Blissymbol users. Each subject interacted with a clinician familiar to him or her in the play contexts. These were videotaped.

The videotaped interactions were transcribed in their entirety to record the following behaviours: the caregivers' verbal output, eye gaze, pointing, gestures and actions and the children's vocalizations, communication board output, eye gaze, pointing, gestures and actions. Transcription reliability coefficients were computed for all of the children's behaviours.

The transcribed interactions were segmented into communicative turns and the turns were coded according to their discourse status (i.e., the links between turns within the flow of interaction), according to the specific communicative intents (illocutionary force) of the turns and according to the mode of message transmission. (See Coding Appendix of this report.) Inter-rater and intra-rater reliability coefficients were determined for each of the three levels of coding across caregivers and children.

## III. Status of Project 1/84:

The following aspects of the project have been completed to date: (1) videotaping of all sample interactions; (2) transcription of all videotaped interactions; (3) transcription reliability; (4) turn segmentation; (5) coding procedures--discourse status, communicative intent and mode, and coding reliability. Statistical analysis of the coding data is in progress.

## IV. Preliminary Findings/Comments:

1. The primary caregivers took approximately twice as many communicative turns as their children.

2. The children only took half the communicative turns they had the opportunity to take. The remaining time, they typically monitored their caregivers' conversation or actions.

3. The children typically took their communicative turns following an oblige by their caregivers (i.e., a request for information, request for clarification, etc). The children seldom took turns following their partners' comments.

4. The caregivers chose most of the topics of the interaction. Most of these topics were already known to both participants.

5. The children seldom initiated topics; they usually responded contingently to their caregivers' demands.

Preliminary Findings (Continued)

6. The children showed a limited range of intents in the interactions with their caregivers; they primarily confirmed or denied their partners' questions, comments or requests for clarification, or they provided specific information requested by their partners.

7. In the eliciting contexts with the clinician, the children showed a wider range of intent, but most still had difficulty requesting clarification or requesting information.

8. The children were able to fulfill the demands set up by their partners in conversation, but they, in turn, set up few expectations for their partners to meet. The children had difficulty cuing for continued interaction.

9. The children used non-board modes of communication (primarily gesture or gesture accompanied by vocalization) as their principal modes of communication.

(Signature)

February 9, 1984

(Date)

## RESEARCH IN PROGRESS - SUMMARY REPORT IP

### IPCAS Study on Interaction

**Title of Project:** The effect of partner question types on the control, efficiency and comfort of nonspeech communication

**Principal Investigator(s):** (Affiliation, Address, Telephone)

Nola Marriner
Department of Speech and Hearing Sciences
University of Washington, JG-15
Seattle, WA 98195
(206) 545-7400

**Type of Research Project:** (Dissertation, Independent Study, Funded Research, Thesis)

Dissertation, University of Washington

**Starting Date:** June, 1984

**Expected Completion Date:** March, 1985

**I. Purpose(s) of the Research Project:** The purpose of the study is to describe how naive partners interact with nonspeaking individuals and to determine the effects of two partner question asking styles on the control, efficiency, and comfort of nonspeech communication interaction. Phase I of the study focuses on interaction styles during a shared-decision making task, and outlines: 1) the percentage of restricted questions asked; 2) the percentage of restricted questions occurring in the first and second half of the interaction; and, 3) the changes that occur after the partners have been asked to use more unrestricted questions. Phase II of the study utilizes information obtained from Phase I to train a partner to use two question asking styles. This phase addresses the impact of the percentage of unrestricted questions on the nonspeaking person's control, efficiency, and comfort.

**II. Project Description:** (Subjects, Methodology; Analysis)

Phase One of the study will utilize five pairs of normal undergraduate females, who deny any visual or hearing problems and who are not majoring in speech and hearing, social work, or special education. One member of each pair will be designated as the nonspeaking individual and will communicate with gestures and through the use of a simulated microprocessor-based communication system at a rate of seven words per minute. The subject pairs will interact in a shared-decision making task which is designed to simulate certain aspects of normal communication interaction where both participants contribute equal information in order to solve a problem. The task involves the joint purchase of cards of different values in order to accumulate a specified number of points. The relative percentage of restricted and unrestricted questions will be obtained from 20 communicative turns.

For Phase Two of the study one undergraduate female will be trained to interact by using two question asking styles - restricted and unrestricted. The training criteria for each question asking style will be obtained from Phase One. Ten normal undergraduate females will be instructed to communicate by gestures and through the use of the microprocessor based communication system. Each nonspeaking individual will interact with the partner in two shared decision making tasks. The partner will use the unrestricted question asking style for one interaction and the restricted style for the other. From 20 communicative turns in each condition a number of dependent measures will be obtained. The control of the interaction will be analyzed by comparing the number and type of initiation and response strategies used by the nonspeaking individual in

## RESEARCH IN PROGRESS

IP ______

### II. Description (Continued)

both conditions. The efficiency of the nonspeaking individual's communication will be measured in terms of the time it takes to complete 20 communicative turns and the relative percentage of task relevant words. A brief questionnaire will be given to the nonspeaking individuals and they will be asked to compare the relative comfort of communication with the two partner question asking styles.

### III. Status of Project 1/84:

Data for Phase I has been collected and is currently being analyzed.

### IV. Preliminary Findings/Comments:

______
(Signature)

[illegible]
(Date)

## RESEARCH IN PROGRESS - SUMMARY REPORT

IP

### IPCAS Study on Interaction

**Title of Project:**

An Attempt to Reliably Define Communication Breakdowns in Nonspeaking/Speaking Dyads

**Principal Investigator(s):** (Affiliation, Address, Telephone)

Ann [illegible]. Ratcliff
Department of Communicative Disorders
1975 Willow Dr.
University of Wisconsin
Madison, Wi. 53706

**Type of Research Project:** (Dissertation, Independent Study, Funded Research, Thesis)

This project is a thesis-level project being done as a part of my doctoral program.

**Starting Date:** January 1984

**Expected Completion Date:** September 19[illegible]

1. **Purpose(s) of the Research Project:**

One of the first steps in a more scientific exploration of augmentative communication interaction must be the defining of behaviors and classes of behaviors that make up the nonspeaking/speaking conversational dyad. This project will be an attempt to formulate reliable operational definitions for those behaviors that serve to make up communication breakdowns between a nonspeaking individual using an augmented communication system and a speaking individual.

II. **Project Description:** (Subjects, Methodology; Analysis)

This project will use a videotape of an individual using an alphabet/word board conversing with a speaking individual. Twenty minutes of the tape will be transcribed and analyzed for those behaviors on the part of both partners that serve as loci for repair. An Attempt will be made to write operational definitions for these behaviors and obtain adequate interjudge reliability measures for this videotape with 6 to 10 other judges. After adequate reliability has been obtained, the judges will be asked to use the same definitions to judge breakdown behaviors in another videotape of different participants.

**RESEARCH IN PROGRESS** IP ______

II. **Description** (Continued)

III. **Status of Project 1/84:**

This project is in the initial stages only.

IV. **Preliminary Findings/Comments:**

None yet

Ann Ratcliffe
(Signature)

2-14-84
(Date)

## RESEARCH IN PROGRESS - SUMMARY REPORT

IP

### IPCAS Study on Interaction

**Title of Project:** An Evaluation of Nonspeech Communication Modes Taught to Cerebral Palsied Children

**Principal Investigator(s):** (Affiliation, Address, Telephone)

Udwin, O. e Yule
Department of Clinical Psychology
Institute of Psychiatry
De Crespigny Park - Denmark Hill
London SE5 8AF ENGLAND

**Type of Research Project:** (Dissertation, Independent Study, Funded Research, Thesis)

Funded research for Ph.D. degree

**Starting Date:**

**Expected Completion Date:**

1. **Purpose(s) of the Research Project:**

The study aims to evaluate the impact of two augmentative modes of communication (Bliss Symbolics and the Makaton Vocabulary - incorporating a selection of signs taken from British Sign Language) on the communicative abilities of nonverbal cerebral palsied children by following up their progress at six month intervals over a total period of two years. The study will further attempt to delineate some of the characteristics of the children; teaching and home environments that are the most significant for progress in each of the two communication modes; and to examine the varying methods that are being used in the schools that teach the systems to nonverbal handicapped children.

II. **Project Description:** (Subjects, Methodology; Analysis)

There are two groups, each comprised of 20 nonverbal cerebral palsied children, aged 3½ years to 11 years, who are being taught Bliss Symbolics and Makaton Signing respectively at the special schools they attend. The children's communicative abilities are being assessd at six monthly intervals, over a two-year time period, using a number of measures of language comprehension and expression, and also measures of symbolic play, natural gesture, imitation ability, knowledge of signs/symbols, and analyses of spontaneous production of sign/symbol skills, etc.) are also being assessed. In addition, questionnaires are circulated to the children's parents, teachers, and speech therapists at six monthly intervals to obtain information on the extent of the children's current use of the systems at home and at school.

**RESEARCH IN PROGRESS** IP ____

II. Description (Continued)

III. Status of Project 1/84:

Research still in progress.

IV. Preliminary Findings/Comments:

____________________ (Signature)

____________________ (Date)

## RESEARCH IN PROGRESS - SUMMARY REPORT

IP

### IPCAS Study on Interaction

**Title of Project:** Comprehension of Synthesized Speech by Preschool Children

**Principal Investigator(s):** (Affiliation, Address, Telephone)

Karyl Wieck
Department of Speech Pathology and Audiology
California State University - Sacramento
600 J Street
Sacramento, CA 95819
Under the direction of Colette Coleman, Ph.D.)

**Type of Research Project:** (Dissertation, Independent Study, Funded Research, Thesis)

Master's Thesis

**Starting Date:** 1983

**Expected Completion Date:** June, 1984

**1. Purpose(s) of the Research Project:**

This study examines the ability of normal children to comprehend synthesized speech as presented by the VOIS 130 portable speech synthesizer.

**II. Project Description:** (Subjects, Methodology; Analysis)

Twenty-four normal children between the ages of 3 years, 2 months and 4 years, 8 months served as subjects in the study of intelligibility. Test stimuli consisted of items selected from the Word Intelligibility Picture Identification test (WIPI). Stimuli were presented via natural speech and synthesized speech from the VOIS 130. The subjects were required to point to the WIPI stimulus picture corresponding to the stimulus word presented. The procedure was repeated one week after the initial test.

**RESEARCH IN PROGRESS** IP

II. Description (Continued)

III. Status of Project 4/84:

The statistical analysis has not yet been completed.

IV. Preliminary Findings/Comments:

(Signature) (Date)

## RESEARCH IN PROGRESS - SUMMARY REPORT

IP

### IPCAS Study on Interaction

**Title of Project:** Assessment of Communication Needs of Nonspeaking Individuals: Phase 1 Development of Quantification Techniques

**Principal Investigator(s):** (Affiliation, Address, Telephone)

Kathryn M. Yorkston, Dept. of Rehab. Medicine RJ-30, University of Washington, Seattle, WA 98195 (206) 543-3134

David R. Beukelman, Dept. of Rehab. Medicine RJ-30, University of Washington, Seattle, WA 98195

Nola Marriner, Dept. of Speech & Hearing Science JG-15, University of Washington, Seattle, WA 98195

**Type of Research Project:** (Dissertation, Independent Study, Funded Research, Thesis)

Research and Training Center Project: National Institute of Handicapped Research, Dept. of Rehabilitation Medicine, University of Washington

| **Starting Date:** | **Expected Completion Date:** |
|---|---|
| 1/83 | 12/87 |

### I. Purpose(s) of the Research Project:

(1) To develop and validate a Needs Assessment Protocol for a series of core communication environments.

(2) To develop and validate a series of "in-clinic" measures performance of individuals using communication augmentation systems. Tasks will include both message preparation and interaction tasks.

### II. Project Description: (Subjects, Methodology; Analysis)

Subjects: 10 nonspeaking, physically handicapped adolescents and adults who are currently using a communication augmentation system. Subject's language and cognition will be described using a variety of standardized tests including Peabody Picture Vocabulary Test, spelling subtest of Wide Range Achievement Test, Raven Progressive Matrices Test, etc.

Methodology:

(1) Interactive Tasks are designed to simulate natural communication situations in which information is exchanged between communication partners. Interactive tasks require the nonspeaking person to transmit a message to a communication partner who is naive to the specific message being conveyed. The communication partner has the opportunity to confirm the content of the message and to ask any questions to clarify messages which are not completely understood. Interactive tasks offer the possibility of quantifying communication breakdowns and breakdown resolution strategies as well as quantifying rate, accuracy, transmission time and vocabulary of messages being produced. These tasks may also be used to sample conversational control.

(2) Message Preparation Tasks are designed to simulate text preparations in which there is no interaction with a communication partner. Messages of various types, lengths and formats are prepared and analyzed for rate, accuracy, vocabulary and level of independence as well as endurance.

## RESEARCH IN PROGRESS IP

II. Description (Continued)

III. Status of Project 1/84:

Initial tasks have been selected and piloted with normal speakers. A coding system has been adapted from one proposed by McKindy & Blank. (See Appendix of this report.)

IV. Preliminary Findings/Comments:

Preliminary results suggest that when normal speakers perform the tasks, patterns of conversational control vary from task to task.

Kathryn M. Yorkston
(Signature)

2/17/84
(Date)

# APPENDIX C

## STRUCTURED CONTEXTS
## FOR THE STUDY OF COMMUNICATIVE
## USE IN AUGMENTATIVE
## COMMUNICATION

In the study of communicative use, information can be obtained by observing aid users in interaction with others in natural environments, or through sampling procedures in which participants are asked to converse as naturally as possible in an observed context. Information about interaction can also be obtained through tasks designed to elicit information about specific parameters of communication and interaction. Three unpublished scripts for eliciting communication behaviors from augmented communicators contributed to the IPCAS report are found on the following pages of Appendix C. Elicitation procedures have been developed to study other aspects of communication use and interaction. See the unpublished and in-progress studies of Farrier et al (IP), Yorkston et al (IP), Light (IP), Marriner (IP), Bailey and Shane (UP-1983), Waldron, Gordon, and Shane (UP-1980), and Sutton-Colquhoun (UP-1983).

# APPENDIX C

## TABLE OF CONTENTS:

1. Snack Routine
   Blackstone, Cassatt, and Issacson, 1983 ..................

   This routine can be used to examine a child's ability to produce a variety of communicative, or illocutionary acts and speaker roles in a snack routine with props and selected symbols.

2. Picnic Routine
   Blackstone, Cassatt, and Issacson, 1983 ..................

   This structured play activity involves the child in an imaginary picnic routine with symbols and props to elicit a variety of communicative acts and speakers roles.

3. Attention-Getting Script
   Miller and Kraat, 1984 ..................................

   This script was used to study the ability of a five year old nonspeaker to gain attention for communication. The sampling procedure presented here provides an idea of how this information might be obtained from a child through selected play contexts and alteration of events within those activities.

## CONTEXTS FOR COMMUNICATION SAMPLING - AUGMENTED COMMUNICATORS AND OTHERS

### Elicited Samples - Blackstone, Cassatt, and Isaacson, 1983

The abbreviations listed under the category of listener's response refer to turn types and illocutionary acts:

I. Turn Type

I: initiated comment

R: response

IR: irrelevant response/comment

NR: no response/no opportunity to respond

U: unintelligible

II. Illocutionary Act Type

R: request

S-S: statement about sender

S-C: statement about context

S-R: statement about receiver

S-P: statement about other

CD: conversational maintenance device

P: performative

F: fantasy

## SNACK ROUTINE

NAME ______________ PARTNER ______________ DATE __________ COMMUNICATION MODE __________ MEAN LENGTH OF UTTERANCE: CHILD ____

ADULT ____

| CONTEXT | NARRATIVE | LISTENER'S RESPONSE | | POSSIBLE COMMUNICATIVE INTENTION | |
|---|---|---|---|---|---|
| Child should be hungry.<br>Food is within view.<br>symbols: drink, eat, play, Teddy | Hi child's name | R<br>I<br>IR<br>NR<br>U | R<br>S-S<br>S-R<br>S-C<br>CD<br>P | conversational device - greeting | 1 |
| | Look at all this food! | R<br>I<br>IR<br>NR<br>U | R<br>S-S<br>S-R<br>S-C<br>CD<br>P | request - action, object<br>statement | 2 |
| | What shall we do? | R<br>I<br>IR<br>NR<br>U | R<br>S-S<br>S-R<br>S-C<br>CD<br>P | response to direct request - wh- question | 3 |
| Bring out Teddy bear. | O.K. Here's Teddy. He wants a snack. Say "hi". | R<br>I<br>IR<br>NR<br>U | R<br>S-S<br>S-R<br>S-C<br>CD<br>P | response to direct request<br>CD - greeting | 4 |
| Put Teddy in chair and make food available.<br>Symbols: food | Sit down, Teddy. It's time to eat.<br>Who wants to eat? | R<br>I<br>IR<br>NR<br>U | R<br>S-S<br>S-R<br>S-C<br>CD<br>P | response - wh- question<br>statement - instruction | 5 |
| | Teddy does.<br>What do you want? | R<br>I<br>IR<br>NR<br>U | R<br>S-S<br>S-R<br>S-C<br>CD<br>P | response to wh- question<br>request - object | 6 |
| Pick up requested food. | What's this? | R<br>I<br>IR<br>NR<br>U | R<br>S-S<br>S-R<br>S-C<br>CD<br>P | response - wh- question<br>statement - label | 7 |
| Give small amount of food to child. | | R<br>I<br>IR<br>NR<br>U | R<br>S-S<br>S-R<br>S-C<br>CD<br>P | request - recurrence | |

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The John F. Kennedy Institute for Handicapped Children, Baltimore, MD 21205

## APPENDIX C

2

## SNACK ROUTINE

| | | | | | |
|---|---|---|---|---|---|
| | Do you want some ________? | R<br>I<br>IR<br>NR<br>U | R<br>S-S<br>S-R<br>S-C<br>CD<br>P | response - yes/no question | 9 |
| Present food so that child can't eat it (e.g., no spoon, closed jar, etc.). | Here it is . . . . | R<br>I<br>IR<br>NR<br>U | R<br>S-S<br>S-R<br>S-C<br>CD<br>P | performative - protest | 10 |
| | What's wrong? | R<br>I<br>IR<br>NR<br>U | R<br>S-S<br>S-R<br>S-C<br>CD<br>P | response - clarify | 11 |
| | Oh, dear. What should I do? | R<br>I<br>IR<br>NR<br>U | R<br>S-S<br>S-R<br>S-C<br>CD<br>P | response - wh- question<br>statement - instruction | 12 |
| Rectify the problem and give the child a few bites | What is Teddy's favorite food? | R<br>I<br>IR<br>NR<br>U | R<br>S-S<br>S-R<br>S-C<br>CD<br>P | response - wh- question<br>statement - labeling | 13 |
| | Well, let's give him some green beans! | R<br>I<br>IR<br>NR<br>U | R<br>S-S<br>S-R<br>S-C<br>CD<br>P | performative - roleplay | 14 |
| Give Teddy green beans. | Teddy says "YUCKY".<br>Now what? | R<br>I<br>IR<br>NR<br>U | R<br>S-S<br>S-R<br>S-C<br>CD<br>P | request - action<br>statement - description | 15 |
| Comply with child's instruction. | | R<br>I<br>IR<br>NR<br>U | R<br>S-S<br>S-R<br>S-C<br>CD<br>P | | 16 |
| Have drinks, napkin, cup in view. | I think Teddy wants a drink.<br>What kind? | R<br>I<br>IR<br>NR<br>U | R<br>S-S<br>S-R<br>S-C<br>CD<br>P | request - object | 17 |

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3

## SNACK ROUTINE

| | | | | | |
|---|---|---|---|---|---|
| Give child more food and then direct attention away from child (up to 60 seconds).<br>Wait for signal from child. | | R<br>I<br>IR<br>NR<br>U | R<br>S-S<br>S-R<br>S-C<br>CD<br>P | Conversational device - call | 18 |
| | Do you want some more? | R<br>I<br>IR<br>NR<br>U | R<br>S-S<br>S-R<br>S-C<br>CD<br>P | response - yes/no question | 19 |
| Do not give more food (yet). | I wonder what you want? | R<br>I<br>IR<br>NR<br>U | R<br>S-S<br>S-R<br>S-C<br>CD<br>P | response to indirect question | 20 |
| Give child something other than what he/she asks for | Here's the __________.<br>(say the requested food) | R<br>I<br>IR<br>NR<br>U | R<br>S-S<br>S-R<br>S-C<br>CD<br>P | performative - denial, protest<br>request qualification | 21 |
| | Whoops, where is the __________?<br>(say the requested food) | R<br>I<br>IR<br>NR<br>U | R<br>S-S<br>S-R<br>S-C<br>CD<br>P | response - wh- question<br>statement - location | 22 |
| Give child requested food. | | R<br>I<br>IR<br>NR<br>U | R<br>S-S<br>S-R<br>S-C<br>CD<br>P | Conversational device | 23 |
| | I wish I had some. | R<br>I<br>IR<br>NR<br>U | R<br>S-S<br>S-R<br>S-C<br>CD<br>P | response - indirect request | 24 |
| If child indicates "yes" . . . . . . .<br>If child refuses . . . . . . . . . . . . | Thank you<br>Oh, well | R<br>I<br>IR<br>NR<br>U | R<br>S-S<br>S-R<br>S-C<br>CD<br>P | conversational device | 25 |
| Put preferred food in view | | R<br>I<br>IR<br>NR<br>U | R<br>S-S<br>S-R<br>S-C<br>CD<br>P | statement - label<br>request - object<br>performative - exclamation | 26 |

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## SNACK ROUTINE

| | | | | | |
|---|---|---|---|---|---|
| Give Teddy a drink but spill some of it on child's table/tray | | R<br>I<br>IR<br>NR<br>U | R<br>S-S<br>S-R<br>S-C<br>CD<br>P | performative - exclamation<br>statement - description | 27 |
| | What a mess! Who will clean it up? | R<br>I<br>IR<br>NR<br>U | R<br>S-S<br>S-R<br>S-C<br>CD<br>P | response - statement | 28 |
| Pick up napkin/towel, wait for response | (pause) Well? | R<br>I<br>IR<br>NR<br>U | R<br>S-S<br>S-R<br>S-C<br>CD<br>P | request - object | 29 |
| Wipe up spill. | Who is still hungry? | R<br>I<br>IR<br>NR<br>U | R<br>S-S<br>S-R<br>S-C<br>CD<br>P | response - wh- question<br>statement - | 30 |
| | O.K., one more bite/sip. | R<br>I<br>IR<br>NR<br>U | R<br>S-S<br>S-R<br>S-C<br>CD<br>P | | 31 |
| Give child more. | Time to clean up. Who wants to clean the table? Does Teddy want to help? | R<br>I<br>IR<br>NR<br>U | R<br>S-S<br>S-R<br>S-C<br>CD<br>P | response - wh- question<br>statement | 32 |
| | Snack time is over. | R<br>I<br>IR<br>NR<br>U | R<br>S-S<br>S-R<br>S-C<br>CD<br>P | | 33 |

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## PICNIC ROUTINE

NAME ______________ PARTNER ______________ DATE __________ COMMUNICATION MODE ________ MEAN LENGTH OF UTTERANCE: CHILD ___ ADULT ___

| CONTEXT (note if referent is absent) | NARRATIVE | LISTENER RESPONSE | | | POSSIBLE COMMUNICATIVE INTENTION | |
|---|---|---|---|---|---|---|
| present figures<br>wait for child to respond | | R | R | | request - action | |
| | | I | S-S | S-C | performative - metalinguistic game markers | |
| | | IR | S-R | | | |
| | | NR | CD | | | |
| P | | LI | P | | | 1 |
| | Today we're going to have a story about a family | R | R | | | |
| | | I | S-S | S-C | | |
| | Let's see who is in our family | IR | S-R | | | |
| | | NR | CD | | | |
| | | LI | P | | | 2 |
| put father out | Here's the father | R | R | | response to DR | |
| | Who else can be in our story? | I | S-S | S-C | performative - roleplay | |
| | | IR | S-R | | statement - label | |
| | | NR | CD | | | |
| | | LI | P | | | 3 |
| add child's selections | Okay, here's ______ | R | R | | performative - role play | |
| | Here's the ______, too | I | S-S | S-C | response to DR - yes/no questions | |
| | Does the baby have a name? | IR | S-R | | | |
| | | NR | CD | | | |
| | | LI | P | | | 4 |
| | What can the baby's name be? | R | R | | Statement - label | |
| | | I | S-S | S-C | response to DR - wh- question | |
| | | IR | S-R | | performative - roleplay | |
| | | NR | CD | | | |
| | | LI | P | | | 5 |
| bring out dog but hide from child's view | This family has a pet too. | R | R | | response to DR - wh- question | |
| | Can you guess what it is? | I | S-S | S-C | statement - descriptions | |
| | | IR | S-R | | performative - role play | |
| | | NR | CD | | | |
| | | LI | P | | | 6 |

It's a puppy dog!
His name is Blackie.

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## PICNIC ROUTINE

| | | | | | | |
|---|---|---|---|---|---|---|
| | Today our family is going on a picnic!<br>Someone's in the kitchen cooking food and making sandwiches for the picnic.<br>Do you know who it is? | R<br>I<br>IR<br>NR<br>U | R<br>S-S<br>S-R<br>CD<br>P | S-C | response to DR - yes/no questions<br>performative - role play | 7 |
| Bring out mother figure | It's Mommy!<br>She's getting ready for the picnic. | | | | | 8 |
| Present food choices: sandwich, hot dogs, hamburger, cheese, cake, soda, OJ, milk, ice cream | I wonder what the family would like to take to eat on their picnic? | R<br>I<br>IR<br>NR<br>U | R<br>S-S<br>S-R<br>CD<br>P | S-C | response to IR - wh- question<br>statement - attribution | 9 |
| | What (else) should they pack? | R<br>I<br>IR<br>NR<br>U | R<br>S-S<br>S-R<br>CD<br>P | S-C | statement - description<br>response to DR - wh- questions | 10 |
| | There's more room in the basket! | R<br>I<br>IR<br>NR<br>U | R<br>S-S<br>S-R<br>CD<br>P | S-C | response to IR - action request<br>statement - instruction | 11 |
| | Let's put something else in to eat | R<br>I<br>IR<br>NR<br>U | R<br>S-S<br>S-R<br>CD<br>P | S-C | response to IR - action<br>statement - instruction | 12 |
| without showing awareness, drop an unselected item to the floor | | R<br>I<br>IR<br>NR<br>U | R<br>S-S<br>S-R<br>CD<br>P | S-C | conversational device: call | 13 |

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## PICNIC ROUTINE

| | | | | | | |
|---|---|---|---|---|---|---|
| | Now, pick something hot for them to eat? | R<br>I<br>IR<br>NR<br>U | R<br>S-S<br>S-R<br>CD<br>P | S-C | response to DR - action<br>Statement - label | 14 |
| Select item of opposite to what child selected.<br>M | | R<br>I<br>IR<br>NR<br>U | R<br>S-S<br>S-R<br>CD<br>P | S-C | conversational device - repetition/ call/exclamation<br>performative - tease | 15 |
| Show surprise | This isn't hot?<br>How does it feel? | R<br>I<br>IR<br>NR<br>U | R<br>S-S<br>S-R<br>CD<br>P | S-C | response to DR - wh- question<br>statement - description | 16 |
| Exchange for correct item<br>P | Here's the ______. Now, everything is packed and ready to go. What does Daddy say? | R<br>I<br>IR<br>NR<br>U | R<br>S-S<br>S-R<br>CD<br>P | S-C | statement - attribution<br>response to DR - wh- question | 17 |
| Respond to child's comment and say . . . | Everybody in the car. | | | | | 18 |
| Put all figures in baby carriage except baby and dog | Here we go. | R<br>I<br>IR<br>NR<br>U | R<br>S-S<br>S-R<br>CD<br>P | S-C | conversational device - exclamation/ call<br>statement - description<br>performatives - protests | 19 |
| Drive off in buggy. | | R<br>I<br>IR<br>NR<br>U | R<br>S-S<br>S-R<br>CD<br>P | S-C | conversational device - call, exclamation<br>performative - protests<br>statement - description | 20 |
| Stop and comment<br>Place figures in car.<br>P | That's not the car! That's the baby buggy! That's silly! | R<br>I<br>IR<br>NR<br>U | R<br>S-S<br>S-R<br>CD<br>P | S-C | performative - teases | 21 |

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# PICNIC ROUTINE

|  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|
|  | Ohoh, we forgot the baby. |  |  |  |  | 22 |
| Put dog in car. | Here's the baby. | R<br>I<br>IR<br>NR<br>U | R<br>S-S<br>S-R<br>CD<br>P | S-C | conversational device - call<br>exclamation<br>performative - tease protests | 23 |
|  | What's wrong? | R<br>I<br>IR<br>NR<br>U | R<br>S-S<br>S-R<br>CD<br>P | S-C | response to DR - wh- question<br>statement - description | 24 |
| " | That's not the baby?<br>That's silly.<br>What should I do? | R<br>I<br>IR<br>NR<br>U | R<br>S-S<br>S-R<br>CD<br>P | S-C | response to DR - wh- questions<br>statement - instruction | 25 |
| Ask child to repeat response |  | R<br>I<br>IR<br>NR<br>U | R<br>S-S<br>S-R<br>CD<br>P | S-C | response to DR - action | 26 |
| Divert attention<br>(up to 60 seconds) |  | R<br>I<br>IR<br>NR<br>U | R<br>S-S<br>S-R<br>CD<br>P | S-C | conversational device - call | 27 |
| Drive car to picnic area. | Here they are at the park. |  |  |  |  | 28 |
| Wait for child to respond.<br>Look expectant. | Well . . . . . | R<br>I<br>IR<br>NR<br>U | R<br>S-S<br>S-R<br>CD<br>P | S-C | request - action | 29 |

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## PICNIC ROUTINE

| | | | | | | |
|---|---|---|---|---|---|---|
| Take figures out. | Everybody out. It's time to eat! Daddy says I'm hungry. Mommy says I'm hungry. Baby says ______. | | | | | 30 |
| Wait for response. | | R<br>I<br>IR<br>NR<br>U | R<br>S-S<br>S-R<br>CD<br>P | S-C | conversational device - return | 31 |
| | Baby says "I'm hungry, too!" | | | | | 32 |
| Take food out of picnic basket and put on table. | Mommy gets the picnic food ready. | | | | | 33 |
| | Mommy says Who wants hot dogs?<br>Baby says"I do". | | | | | 34 |
| Mother hands baby hot dog. | Mommy says "What do you say?" | R<br>I<br>IR<br>NR<br>U | R<br>S-S<br>S-R<br>CD<br>P | S-C | conversational device - politeness markers | 35 |
| | (if no response, say)<br>What does baby say? | R<br>I<br>IR<br>NR<br>U | R<br>S-S<br>S-R<br>CD<br>P | S-C | conversational device - politeness markers | 36 |
| | Baby says thank you. | | | | | 37 |
| | Mommy says "Here Daddy. Here's your hot dog." What does Daddy say? | R<br>I<br>IR<br>NR<br>U | R<br>S-S<br>S-R<br>CD<br>P | S-C | response to DR - wh- question<br>conversational device - politeness marker | 38 |
| | Thank you. | | | | | 39 |

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APPENDIX C

## PICNIC ROUTINE

| | | | | | | |
|---|---|---|---|---|---|---|
| Mumble statement, pause for child's response, look expectant | | R<br>I<br>IR<br>NR<br>U | R<br>S-S<br>S-R<br>CD<br>P | S-C | conversational device: contingent query | 40 |
| | Tell me. | R<br>I<br>IR<br>NR<br>U | R<br>S-S<br>S-R<br>CD<br>P | S-C | statement - internal report<br>conversational device - contingent query | 41 |
| F | What does Daddy want for dessert? | R<br>I<br>IR<br>NR<br>U | R<br>S-S<br>S-R<br>CD<br>P | S-C | response to DR - wh- question<br>statement - attribution | 42 |
| (include child's response) | Daddy wants __________. | | | | | 43 |
| | Baby will eat dessert too. What can Baby eat? | R<br>I<br>IR<br>NR<br>U | R<br>S-S<br>S-R<br>CD<br>P | S-C | response to DR - wh- question<br>statement - description | 44 |
| M | Everybody's finished eating. Dad says "Time to go home. Everybody in the car." | | | | | 45 |
| Put figures in car. Point to car wheel which is laying beside car. | Oh no! | R<br>I<br>IR<br>NR<br>U | R<br>S-S<br>S-R<br>CD<br>P | S-C | conversational device - exclamation<br>statement - description<br>request - action | 46 |
| If no response, say . . . | What happened? | R<br>I<br>IR<br>NR<br>U | R<br>S-S<br>S-R<br>CD<br>P | S-C | response to DR - wh- question<br>statement - description | 47 |

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## PICNIC ROUTINE

|  |  |  |  |  |  |
|---|---|---|---|---|---|
|  | What will the family do? | R<br>I<br>IR<br>NR<br>U | R<br>S-S<br>S-R<br>CD<br>P | S-C | response to DR - wh- question<br>statement - attribution |

49

---

| Conclusion: |  |
|---|---|
| 1. father fixes | 1. OK. Daddy will have to fix it. |
| or | or |
| 2. all figures taken out of car | 2. They'll all have to walk home! |

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---

Everyone went home.

They had fun at their picnic.

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## STUDY OF ATTENTION - GETTING BEHAVIOR

### THE SCRIPT

| | Toy/Activity | Scenario To Elicit Attempts | Expected Communication Behavior | Environmental Variables Planned |
|---|---|---|---|---|
| 1 | Pull Toy & Mr. Potato Head | Partner is talking outside of room. Toys are in non-speaker's view. | wants attention to play | not attentive<br>not looking |
| 2 | | Partner comes over to nonspeaker but does and says nothing. | will request pull toy | normal |
| 3 | Pull Toy | Toy positioned out of reach. | wants help | not looking |
| 4 | | Partner playing with toy and not including nonspeaker. | wants turn | not quiet<br>not looking<br>not attentive |
| 5 | Mr. Potato Head | Partner starts lining up toy parts, talking about them. | reject toy | not looking<br>not attentive |
| 6 | Basketball | After a few regular turns, nonspeaker not positioned close enough to throw ball into basket. | wants help | not close (partner behind nonspeaker) |
| 7 | | Experimenter 2 comes in and talks with partner. | wants to resume playing | not close (partner behind nonspeaker)<br>not quiet<br>not looking<br>not attentive |

## THE SCRIPT

| | Toy/Activity | Scenario To Elicit Attempts | Expected Communication Behavior | Environmental Variables Planned |
|---|---|---|---|---|
| 8 | Photo Album | Partner comments about several pictures of nonspeaker in daily activities, then turns page and says nothing. (If nonspeaker does nothing look at him.) | wants more "talk" | not looking<br>or normal |
| 9 | Tape Recorder & Cash Register | Toys in nonspeaker's view. | wants toy | not close (partner across room) |
| 10 | | Partner gives nonspeaker tape recorder but button is not depressed so his switch won't work. | wants help | not looking |
| 11 | | Partner takes recorder and plays it, humming. | wants toy back | not looking<br>not attentive<br>not quiet |

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## THE SCRIPT

| | Toy/Activity | Scenario To Elicit Attempts | Expected Communication Behavior | Environmental Variables Planned |
|---|---|---|---|---|
| 12 | Cash Register | Partner demonstrates toy and continues to play with it. | wants toy | not looking<br>not attentive<br>not quiet<br>(tape recorder left on) |
| 13 | | Partner puts "money" in wrong slot so lever will not depress. | wants help | not quiet |
| 14 | | Partner puts "money" in the other wrong slot. | wants help | not quiet |
| 15 | "If you're happy and you know it" (Song) | Sing one verse then ask nonspeaker which part of body we should shake. After second verse wait and walk away. | want to direct song ( select body part) | not close |
| 16 | | Song is over, nothing is offered. | wants more song or another toy | normal |

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## THE SCRIPT

| | Toy/Activity | Scenario To Elicit Attempts | Expected Communication Behavior | Environmental Variables Planned |
|---|---|---|---|---|
| 17 | Clown Target & Velco Balls | Partner introduces new toy, looks around for tape, and talks about needing tape to hang up clown. (Piece of tape was put on nonspeakers finger at beginning of session to remind him to isolate finger for direct selection. Tape was then left near the door.) | direct partner to tape | not looking<br>not attentive<br>not close |
| 18 | | Help nonspeaker play three times and then wait. | wants more | normal |
| 19 | Sink Set | Partner puts dishes in sink but discovers there is no water. | request water | not looking |
| 20 | | Partner pours water in well and starts pushing handle. | wants to push | normal |
| 21 | | Partner pulls sink away from nonspeaker squirts soap into water and starts splashing. | wants toy | not looking<br>not close. |

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## APPENDIX D

### Transcription and Coding Systems Used in the Study of Communicative Interaction Between Aid Users and Others

This Appendix contains several researcher's transcription and coding systems that were contributed to the IPCAS report, and are unpublished to date. These coding schemas have been applied to the study of interaction between aided speakers and others, or are being utilized in current research efforts. One should also be aware of several published coding formats in communication research involving nonspeakers (Calculator and Dollaghan, 1982; Beukelman and Yorkston, 1982; Harris, 1978; Shere and Kastenbaum, 1966; Wiig, 1982; Calculator and Luchko, 1983) and the schemas outlined by Higgenbotham and Yoder, 1982. Coding systems that are primarily used for clinical vs. research purposes are included in Appendix E.

The transcription and coding systems included here were used in research studies summarized in either Appendix A or B, as unpublished or in-progress reports. Several of the schemas were previously discussed in section IV of this report. Some of the systems found in this appendix address transcription issues in nonspeech communication and are of interest to those struggling with the recording of non-verbal behaviors, device produced utterances, and how observed behaviors might be segmented in this type of interaction (e.g., the boundaries of an utterance; separation of technical production acts from propositional acts). (See Light; Marriner et al; Buzolich; Fishman and Timler).

The coding systems presented vary widely in the aspect of communication behavior that is being studied, the definitions of categories and concepts, and the degree of sub-coding or complexity brought to the analysis. Coding of discourse units is the primary interest in the systems developed by Light and Marriner et al. Other researcher's work reflects a primary interest in the communicative acts expressed in an interaction (See Wexler, Lossing). However, it should be noted that several coding systems examine a broad set of behaviors which include some discourse and communicative act features. Communication breakdown and the repair of that miscommunication has been the research focus in several of the coding schemas. Coding systems for this behavior have been suggested here by Fishman and Timler, Marriner et al, Bailey and Shane, and Calculator and Delaney. Additional coding schemas examine attention-getting behavior (Kraat and Miller), strategies that are used to increase communication rate (Bailey and Shane), paralinguistic and kinesic behaviors in interaction (Beuttemeir), and back-channel behaviors (Blau).

## APPENDIX D

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1. Bailey, P. and Shane, H., Interactional Strategies Used By Subject and Adult Communicators (UP-1983)........
2. Beuttemeier, C., Data Sheet For On-Line Coding, (UP-1983) ..........................................
3. Blau, A., Coding Scheme For Back-Channel Communication Analyses, (IP-1983) ........................
4. Buzolich, M., Transcription Notations (UP-1983) ...........
5. Calculator, S., and Delaney, D., Coding System - Responses to Non-Specific Requests For Clarification (UP-1984) ..........................................
6. Colquhoun, A., Parameters Coded, (UP-1982) ................
7. Fishman, S., and Timler, G., Boundaries Of An Utterance; Repair Strategies, (UP-1983) .................
8. Kraat, A., and Miller, M., Definitions For Coding Attention Getting Behavior, (Miller and Kraat, UP-1984) ..
9. Light, J., Coding System, (UP-1983) ........................
10. Lossing, C., Definitions; Communication Profile, (UP-1981) ...........................................
11. Marriner, N., Yorkston, K. and Farrier, L., Transcribing And Coding Communication Interaction Between Speaking And Nonspeaking Individuals, Working Paper, 1984 (See Farrier et al, IP; Yorkston et al, IP) .............
12. Wexler, K., System of Analysis, (UP-1983) (See Wexler, Blau, Leslie, and Dore, UP-1983) ...........

UP-Unpublished Studies (Appendix A)
IP-In Progress Studies (Appendix B)

## TRANSCRIPTION/CODING SYSTEMS
(Bailey and Shane, 1983)

## I. INTERACTIONAL STRATEGIES USED BY THE SUBJECT

(CA) Communication Aid use -- refers to eye pointing to board.

- $CA_1$ -- requests that board be placed on lap tray
- $CA_2$ -- requests that board be used with partner
- $CA_3$ -- requests alphabet board for spelling specific word(s)

(EC) Eye-contact -- used to gain and/or maintain the attention of another, either prior to or during an interaction.

(AS) Affective Status -- facial expression and head/body movement used to acknowledge a prediction or to convey feelings of anger, interest, surprise, happiness, sadness, etc.

- $AS_1$ -- face and/or head gesture (includes yes/no response
- $AS_2$ -- increased head/body movement (also intended to attract attention of another)

(V) Vocalizations

- $V_1$ -- refers to intelligible vocalizations
- $V_2$ -- refers to letter cueing
- $V_3$ -- refers to unintelligible vocalizations

(Pres) Presuppositions -- refers to the reliance on shared information, previous knowledge of topic and contextual information. Presuppositions may also be acknowledged by eye pointing to objects or people in the room that can enhance the effectiveness of message transmission.

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## II. STRATEGIES USED BY EITHER OF THE ADULT COMMUNICATION PARTNERS

(BS) Board Strategies

$BS_1$ -- spelling aloud letters that the subject has encoded

$BS_2$ -- decoding words and phrases on the matrix board

$BS_3$ -- creative board strategies such as determining if a series of letters is one or more words; encouraging rhymes and synonym usage, etc.

$BS_4$ -- providing the correct spelling for a misspelled word.

(Pred) Prediction -- used to complete or fill in information provided.

$Pred_1$ -- prediction based on previously generated information (at least two sounds or words)

$Pred_2$ -- prediction not based on at least two previously generated pieces of information (implied here is some prior knowledge of topic)

$Pred_3$ -- prediction and expansion based on information already generated, but expanded to include new information

(SC/I) Seeking Clarification or Information -- refers to question forms generated to request information or to clarify information.

$SC/I_1$ -- yes/no questions (includes questions such as "yeah?" "no?")

$SC/I_2$ -- two choice questions

$SC/I_3$ -- open-ended questions

$SC/I_4$ -- request for a vocalization or a letter use

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TRANSCRIPTION/CODING SYSTEMS

$SC/I_5$ -- request to use communication aid

$SC/I_6$ -- request for repetition (of any of the above)

(CB) Communication Breakdown

$CB_1$ -- acknowledging that a prior prediction is incorrect

$CB_2$ -- acknowledging that the subject's message is incomprehensible

(INT) Interpretor -- refers to assuming the role of interpretor when communication breaks down with a third partner.

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## TRANSCRIPTION/CODING SYSTEMS

### DATA SHEET FOR ON-LINE CODING*
(Buettemeier, 1983)

| SUBJECT SPEAKER ROLE | DEGREE OF SUCCESS |
|---|---|
| initiator | successful |
| respondent | unsuccessful |

**MODE OF MESSAGE**

board non-board no response

**SITUATION, INTRA- & INTER- PERSONAL ASPECTS**

living unit school

12' 12'-4' 4'-18" 18"-contact

length of interaction ________

interactant ___________

**OUTCOME OF MESSAGE** interactant:

- accepts message
- ignores message
- rejects mode
- rejects content
- initiates new topic
- requests clarification

**COMMUNICATIVE EVENT**

- giving info
- getting info
- solving problems
- entertainment
- learning new behavior
- conv. & dialogue
- expressing: intentions, beliefs, feelings
- get interactant to: do, believe, feel
- undeterminable

### PARALINGUISTICS

**Vocal Quality**

- pitch range
- artic control
- rhythm control
- resonance
- sex differentiation
- emotional arousal
- personality
- ling. comprehension

**Vocal Characterizers**

- marked inhalation
- vocal clicks
- laugh, cry, yawn, sigh
- emotional state
- physiologic state
- regulate interaction

**Vocal Qualifiers**

- intensity
- pitch height
- personality, emotional arousal
- regulate interaction

**Vocal Segregates**

- filled pauses
- hesitations
- silence
- pauses
- emotional arousal
- convey meaning
- modify message
- regulate interaction

**Prosodic Features**

- segmental stress
- linguistic stress
- mark sentence type
- clarify meaning
- regulate interaction

### KINESICS

**Emblems**

- y/n head shake
- point to indicate
- confirm accuracy
- convey meaning
- modify message

**Illustrators**

- logical/spacial gestures
- motor movements in synchrony w/ speech
- level of inter-personal involv.
- mark phonemic, semantic, syntax boundaries

***Regulators**

- head movements
- gaze shifts
- arm movements
- hand tension
- gesture
- posture shift
- facial display
- initiation/termination
- turn-taking
- provide feedback
- maintain listener attn.
- undeterminable

**Adaptors**

- body or object focused movements
- indicate psychologic anxiety/discomfort, emotional arousal

NAME ____________

DATE _______ TIME _____

CONFIDENCE RATING 1 2 3

---

*Based in part on coding systems referred to by Calculator & Dollaghan (1982), Yoder & Riechle (1977), and Higginbotham and Yoder (1982).

## TRANSCRIPTION/CODING SYSTEMS

(Blau, 1983)

### CODING SCHEME FOR BACK-CHANNEL COMMUNICATION ANALYSES

| UNIT | DEFINITION | EXAMPLE |
|---|---|---|
| Restatement Back-Channel<br>RBC | repeats, restates, or recalls prior speaker's utterance; prior utterance may be a complete proposition, a single word, or a letter. | NSP (L)<br>* SP L<br>NSP (A)<br>* SP A<br>NSP (S-T)<br>* SP Last |
| Expansion Back-Channel<br>EBC | completion or expansion of prior speaker's utterance. | NSP (W-O-U)<br>* SP Would<br>NSP (Y-O-U)<br>* SP Would you go... |
| Query Back-Channel<br>QBC | brief requests for clarification (implicitly or explicitly produced); may take the form of restatement or expansion back-channels with the addition of rising tone (e.g. confirmation check). | NSP (I-MISSED-BY-11)<br>* SP You missed passing, Y'mean by eleven ↑<br>NSP (C-O)<br>* SP C-O↑ |
| Correction Back-Channel<br>CBC | unmodulated corrections of prior speaker's utterance; prior utterance may be a complete proposition, a single word, or letter; no attempt is made to claim the speaking floor. | NSP (c-U-S-I-N)<br>* SP Cousin is C-O-U<br>NSP (C-O-U-S-I-N) |
| Acknowledgement Back-Channel<br>ABC | acknowledgement/attentional signals used singly or repeatedly; may be lexical item (e.g., yes), vocal emblem (e.g., mhm), expressive (e.g., alright), or signals produced in the nonverbal mode; | NSP (I-T-S)<br>SP It's<br>NSP (G-U-E-S-S-I-N-G)<br>* SP I see |
| | includes head nods, smiles/directed gaze, and other nonverbal signals, and idiosyncratic signals (e.g., vocalizations which have no linguistic or emblematic form). | NSP (I)<br>SP I<br>NSP (P-R-E-F-E-R)<br>* SP ((head nod)) |
| Back-Back-Channel<br>BBC | acknowledgement/agreement signal produced by prior speaker following his conversational partner's restatement, expansion, acknowledgement back-channel; includes information supplied following partner's query or correction back-channel, may be verbally or nonverbally produced. | NSP (C-O-M-M-U)<br>SP communication board<br>*NSP /mhm/ |
| | Included in this classification are the acknowledgement/disagreement signals produced by prior speaker following his conversational partner's restatement, expansion, etc. | NSP (W-I-L)<br>SP With<br>*NSP (NO) |

NSP= Nonspeaking Partner
SP= Speaking Partner

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## TRANSCRIPTION/CODING SYSTEMS

(Buzolich, 1983)

Notation System*

| Interactants | Transcription |
|---|---|
| Normal Speaker (Unaided communicator) | U |
| Augmented Communicator (Aided Comm.) | A |
| **Verbal Behavior** | |
| Verbalizations by normal speaker and encoded linguistic output by augmented communicator | Orthographic transcription<br>e.g. Oh Yeah? I didn't know that.<br>Messages spelled on the alphabet speller by A were put in parenthesis. |
| **Vocal Behavior** | |
| Non-linguistic and linguistic vocalizations (unintelligible speech) | International Phonetic Alphabet<br>e.g. /m/ /o/ /jae/ |
| Intonation/Prosodic Quality: | |
| rising | ↗ |
| falling | ↘ |
| sustained | → |
| low rise | , |
| high rise (interrogative) | ? |
| low fall (end sentence) | . |
| exclamatory | ! |
| increased volume | CAPITALS |
| stressed words/phrases | Underline |
| Laugh | ((LF)) |
| Grunt, guttural sound | ((GR)) |
| **Pause Length** | |
| ≤ 3 seconds | ( ) |
| > 3 seconds | (# sec.) |
| **Nonverbal Behavior** | |
| Changes in gross motor activity: behaviors involving hand movements, body orientation, facial expressions, and eye gaze were described | e.g. U brings L hand ↓. rests arms on legs, diverts gaze from A |
| Movement toward Left | L |
| Movement toward Right | R |
| Movement up (including eye gaze) | ↑ |
| Movement down " " " | ↓ |
| Eye gaze to right | → |
| Eye gaze to left | ← |
| Eye gaze toward camera | ▽ |

The occurrence of nonverbal, verbal, and vocal events across interactants were numbered sequentially with subscripts. All behaviors occurring simultaneously across interactants were given the same subscript.

* Modification of Ochs (1979)

## TRANSCRIPTION/CODING SYSTEMS
(Calculator and Delaney, 1984)

### Coding System - Responses to Non-Specific Requests for Clarification

I. Nonrevisions

A. Repetition - The form and content of the subject's response to the request for clarification was exactly the same as his original utterance. In order to be scored as a repetition, the revised utterance had to have been conveyed through the same mode on both attempts and the content of the gestures or vocalizations (even when unintelligible) was the same. Prosodic changes were ignored.

Subject: "Mom" (on the board)

Examiner: "What?"

Subject "Mom" (on the board)

B. No Response - The subject failed to respond in any manner (i.e., remained silent) following his examiner's request for clarification.

C. Topic Change - The subject responded with an utterance which was unrelated to the topic of the original utterance, regardless of the mode used.

Subject: "I saw mom"

Examiner: "What?"

Subject: "Lunch, french fries"

D. Unintelligible - These messages were unintelligible to the observer and did not convey any apparent meaning. Unlike repetitions (previously defined), these utterances did not repeat forms expressed prior to the request for clarification.

Subject: "pub"

Examiner: "What?"

Subject: "lar"

II. Revisions

These occurred when the context, form or mode of the message following the examiner's request for clarification differed from that of the original message. These responses were subdivided as follows:

A. Phonetic Change - These were changes in the phonetic structure of the message. For messages conveyed on the communication board, phonetic

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revisions were coded when the board content remained the same in the revised message, yet the subject attempted to issue a more intelligible vocal response and/or gestural response. These revisions involved articulatory revisions.

Subject: "I wok"
Examiner: "What?"
Subject: "I work:

B. Message Elaboration - These were coded when the subject introduced a morpheme in his/her revised message which was not present in the original message. This involved syntactic expansions or extended meanings of the previous utterance.

Subject: "I was outside"
Examiner: "What?"
Subject: "I was running outside"

C. Message Reduction - These occurred when a morpheme appearing in the original utterance was deleted from the revised utterance, resulting in an elliptical form or the original message.

Subject: "I was cold outside"
Examiner: "What?"
Subject: "I was outside"

D. Message Substitution - These revisions did not result in a substantial change in the meaning of the original message. They simply replaced a word (either on the communication board or orally) from the original message with a new word in the revision.

Subject: "It tastes good"
Examiner: "What?"
Subject: "The cake tastes good"

E. Mode change - These occurred when the nonspeaking subjects responded by moving from a nonboard to a board or from a board to a nonboard conveyed message without any accompanying change in meaning from his original message. For speaking subjects, this was scored in cases of their moving from a nonverbal to a verbal mode of responding, or vise-versa. This situation also included instances in which the subject added a mode and repeated the original message exactly, as in the following episode:

Subject: "Mom" (pointed to the symbol on the board)
Examiner: "What?"
Subject: "Mom"
(pointed to the symbol and vocalized)

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## TRANSCRIPTION/CODING SYSTEMS

### PARAMETERS CODED

- PARTICIPANT
  - S- produced by the speaking person
  - B- produced by the Blissymbol user
- RELATIONSHIP TO CONTENT
  - Meta-Talk- concerning the communication system itself
  - Content- information exchange
- TYPE of utterance
  - Initiation- introducing a new topic or subtopic, not directly related to the previous utterance
  - Confirmation- verifying the accuracy of the previous utterance. Usually reading aloud the word printed below the symbol.
  - Sub-question- narrowing the field of choice of responses (e.g., following a WH question such as "What did you do on the weekend?" a series of choices might be provided such as "Did you visit your friends? Did you go to the football game? Did you watch tv?" which require a simpler response than the original open-ended question.)
  - Encouragement- reminder to respond
  - Response- related to a previous utterance
- FUNCTION of the utterance
  - Statement or Description
  - Instruction or Command
  - Content Question- information-seeking
  - "Rhetorical" Question- the answer is already known by the asker (e.g., a question such as "What is the weather like today?" asked in front of a window).
  - Yes/No Question
- FORM of the utterance
  - Sentence- containing a subject and verb
  - Fragment- single words or phrases
- MODE of the utterance- how the utterance was produced
  - Verbal/vocal
  - Head shake or nod
  - Gesture or pointing
  - Facial Expression
  - Blissymbols

TYPE, FORM, FUNCTION, and MODE all had "Other" categories for utterances which did not clearly fit into one of the other categories.

Ann Calquhoun, 1982
Adapted from Harris, 1978

## TRANSCRIPTION/CODING SYSTEM

### BOUNDARIES OF AN UTTERANCE
(Fishman & Timber, 1983)

The unit of analysis is the utterance level in a normal speaker.

One utterance is composed of one or more events or exchanges. Ideally, only one event is needed to communicate an utterance.

A breakdown occurs when an utterance requires more than one event in order to communicate.

Each utterance takes the form of one of the following: (1) examiner initiation, (2) examiner response, (3) client initiation, (4) client response.

A speaker can produce one or more consecutive initiated utterances without receiving a response from the listener. An initiated utterance must be completed before another can be initiated by the same speaker. In conversation with 2 normal speaking partners, each utterance is usually completed with one event. However, when a breakdown occurs, more than one event (i.e., exchange) may be necessary to complete an utterance. Since both partners must work to repair breakdowns, exchanges (i.e., events) by the listener are not coded as initiations unless the purpose of the utterance is not to facilitate repair. Normal speaking interactants often initiate new utterances within a breakdown, while the communication board user is formulating a repair strategy.

The completion of an utterance is the end of the client's attempts to communicate one utterance and is signalled by one of the following:

1. a confirmation preceded by an examiner's check
2. a confirmation preceded by an examiner's guess
3. an event immediately followed by a new utterance

Although confirmations occur within the breakdowns they do not signal the completion until the entire utterance has been communicated.

An incomplete utterance is indicated by the abandonment of an intended utterance.

The following example will help clarify the components of an utterance:

1. E: Does he have any children? [EXAM/INIT]
2. C: He has little X. [XV] [CLIENT/RESPONSE]
3. C: B-O-Y [SPCLAR]
4. E: He has a little boy? [CHECK]
5. C: Yeah [v] [CU]

This entire exchange constitutes one completed utterance. Each line is one event which forms the utterance. The utterance is not complete until the client confirmed that the message was received correctly.

## REPAIR STRATEGIES USED BY THE CLIENT:

PCLAR: The client's clarification of an event via pointing to a word on the communicaton board.

SPCLAR: The client's clarification of an event via spelling

VCLAR: The client's clarification of an event via an intelligible vocalization.

XVCLAR: The client's clarification of an event via an unintelligible vocalization.

GCLAR: The client's clarification of an event via a gesture.

SVPCLAR: The client's clarification of an event via simultaneously pointing and vocalizing.

RESTART: The client's communication that an event will be changed. This usually takes the form of the client signalling the s/he will start over.

REFORM: The client's reformulation of an event in order to communicate the same utterance; An attempt to communicate the utterance a new way.

CONFIRM: The client's response to a check or a guess (yes/no)

## REPAIR STRATEGIES USED BY THE EXAMINER:

CHECK: The examiner's verbal restatement of the client's event, including verbal paraphrases or summaries of the utterance to ensure that all the information has been received correctly.

GUESS: The esaminer's attempts to guess the client's event; This includes guessing a word from an unintelligible vocalization or partial spelling or guessing part of the utterance or the intended completed utterance.

REDIRECT: The examiner's redirection of the client to his communication board either verbally or nonverbally.

REQ/CLAR: The examiner's request for clarification of the client's preceding event via a question of statement such as "I don't know" or "I don't understand" or "What?" This strategy is related to the intelligibility of the preceding event.

REQ/INFO: The examiner's request for the client to supply more information about the intended utterance.

S. Fishman & G. Timler, 1983

## DEFINITIONS FOR CODING ATTENTION GETTING BEHAVIOR IN NONSPEAKER

A. Kraat and M. Miller, 1984

### I. Listener/Environmental Variables :

A. Attentive - In this condition the communication partner is not engaged in another activity and is involved in interaction or communication with nonspeaker. The partner may or may not be looking at nonspeaker, and may or may not be talking to him/her. Non-attentive refers to situations in which the communication partner's attention is involved in other activities, e.g., talking with someone else, performing an action, etc.

B. Looking - In this condition the communication partner is looking at the nonspeaker, from a close or distant position. Non-looking implies the partner is looking in directions other than directly at the speaker (e.g., at the mutual toy activity).

C. Not Quiet - This condition refers to situations in which there is environmental noise (e.g., music, other people talking, noise of a toy or activity) which may or may not interfere with signaling of the desire to communicate through auditory means. Quiet as a condition refers to a relatively quiet environment without interfering noises.

D. Proxemics - This condition refers to the distance between the nonspeaker and the communication partner. Four proxemic conditions were noted. These included:

P1 - The partner is close enough to the nonspeaker to allow for direct body contact (e.g., pulling, touching, tugging).

P2 - The partner is within three feet of the nonspeaker, but not close enough for body contact (P1)

P3 - The partner is beyond three feet of the nonspeaker, but within the same room.

PB - The communication partner is not facing the nonspeaker, but is behing him (e.g., pushing the wheelchair). This proxemic behavior was further grouped as close (P1 and P2), and not close (P3).

### II. Attention-Getting Behavior for Communication

A behavior judged by persons highly familiar with the nonspeaker as being intentional to get another person's attention for some subsequent communication attempt. Attention getting behaviors have to be followed by an attempt to non-verbally or

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linguistically communicate something to another person that is not required by the behaviors of the communication partner (e.g., was not an answer to a question). Attention getting behaviors can be combined with, or separate from, the communicative act itself. Each speaker has a set of available behaviors or modes through which attention can be gained under various conditions.

Attention getting behaviors were distinguished from general interaction with people and objects by the context and known behaviors of the nonspeaker. Examples of general interactive behaviors included attempting to physically play with a toy, looking to see what was on the table, etc.

### III. Communication Modes Used by the NonSpeaker To Gain Attention

A. Banging Noise - Noise created by intentional banging of nonspeaker's body or body parts (e.g., feet, fist)

B. Vocalization - Vocalizations that can be differentiated by familiar persons as different from vocalizations used for affirming or pleasure, and are used for the purpose of gaining atention. Attention-getting vocalizations were observed to vary in intensity, duration and pitch from other vocalizations and from "squeal".

C. Squeal - Type of vocalization used to gain attention that is shrill and annoying. This vocalization was differentiated from other vocalizations for gaining attention by its whining quality and its exaggerated duration, pitch and intensity.

D. Arm Pointing - Left arm extension that is used to indicate the location of an object or an object/activity that the nonspeaker wants to signal as a communication topic/symbol. This category can also be reaching or pointing toward the person whose attention is desired.

E. Touching - Body contact between the nonspeaker and communication partner, or with an object to gain attention to communicate.

F. Symbolic Gesture - Arm or head gesture used by nonspeaker to represent a particular referent (e.g., bringing the left arm to the chest to indicate "me). Yes/no head nods are included in this category. Arm pointing for location or object is excluded from this category.

G. Visual Symbol - Pointing to a visual symbolic representation of a word, concept or phrase (e.g., pointing to the symbol "toy"). These symbols are available to the nonspeaker

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through a series of communication boards on his lapboard.

H. Eye Pointing - Nonspeaker's use of gaze to intentionally indicate a referent or location in the environment after he has mutual gaze with his partner. This differs from eye gaze in that it is used in a sequential manner, and is the primary mode of the communication attempt.

I. Eye Gaze - The nonspeaker's use of eye gaze to either make mutual contact with the partner (mutual eye gaze); to see if the partner is looking; or as an accompaniment to arm pointing or visual symbol use in communication efforts.

J. Head Turn - Intentional head turn to indicate or look at a location/object or to look at the communication partner. Not included are head turns that result from reflex patterns, or head movements not associated with an attention getting sequence.

K. Action - A physical activity or action used by the non-speaker to gain attention and communicate that is not included in other communication mode descriptions (e.g., closing a book to communicate that he is finished; pulling out a different symbol board than the one that is in use).

## IV. Coding of Attention-Getting Trial and Attempts

A. Communication Attempt - Attention getting behaviors of the non-speaker that occur within 3 seconds of each other and are collectively aimed at gaining the attention of the other partner. A communication attempt may consist of a single effort, use of simultaneous modes, serial combinations, or multiple attempts. These behaviors are coded as part of the same communication attempt as long as they meet the time criterion and the listener's attention has not been gained.

The terminal boundaries of an attention-getting attempt are defined as: (1) the point when the nonspeaker begins an effort to gain the partner's atention in order to communicate (see definition of attention getting behaviors); and, (2) concludes when either the partner's attention is gained or three seconds of no activity occur.

Communication attempt may consist of:

1. A single trial attempt - the attention-getting attemp consists of one effort; this may be a single mode trial, multiple mode-simultaneous trial, or a multiple mode-sequence (see below).

2. Multiple trial attempt - the attention-getting attempt consists of more than one effort within a three-second

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time period prior to gaining a person's attention. These efforts may consist of single mode trials, multiple mode-simultaneous trials, or multiple mode-sequence trials. The multiple trials may be repetitions of the same behavior (e.g., repeated vocalization), or alterations of the attention-getting strategy (e.g., vocalization, then leg kicking and arm pointing).

B. Communication Trials - are individual trials at getting attention which occur within a communication attempt (see above). These trials are further described as:

1. A single mode trial - an attention-getting attempt in which a single communication mode is used (e.g., vocalizing).

2. Multiple mode trial - simultaneous - an attention-getting attempt in which more than one mode of communication is used at the same time (e.g., vocalizing and pointing simultaneously).

3. Multiple mode trial - sequential pattern - an attention-getting attempt in which more than one mode of communication is used in a sequential pattern; the sequential pattern is judged to be part of one unit of attention-getting behavior if the sequential pattern appears to hang together as one attention-getting sequence (e.g., looking at a partner and then pointing to a symbol).

## V. Successfulness of Attention Getting Attempt

A. Successful Attempt - The nonspeaker gains the attention of the partner as evidenced by the partner's actions, verbal or non-verbal behaviors. In regard to success, the last trial or combined pattern within that attempt is coded as the successful trial for that attention-getting attempt. Earlier trials (if any) are coded as unsuccessful trials .

B. Unsuccessful Attempt - The partner's attention is not obtained as evidenced by his or her actions or verbal behavior by the end of the attention getting attempt (three second lapse without attention-getting behavior occuring). The nonspeaker may or may not try to gain the partner's attention again after a three second time lapse for the same communication reason.

C. The communication partner was instructed in this study to respond immediately to any identifiable attempts to gain attention.

## VI. Coding of Attentional Breakdowns

A.. Mis-match - Incidents in which the partner responded to behaviors of the nonspeaker as if they were attention getting

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behaviors when they were not. Mis-matches were determined by the subsequent behaviors and interactions that occurred following the partner's response (e.g., nonspeaker did not want anything).

B. Ambiguity - Incidents in which the partner interpreted attention getting behaviors as some other behavior in relation to what was going on in the interaction (e.g., the nonspeaker attempted to push the book away, and the partner interpreted this behavior as pointing to a picture).

C. Pre-occupation of the Partner - The mode used may be appropriate, but the partner is pre-occupied and does not recognized the attempt and respond (e.g., thinking, manipulating a toy, getting ready for the next activity).

D. Inappropriate mode use - The communication mode used by the nonspeaker can not gain the partner's attention under the environmental conditions presented (e.g., pointing to a symbol when the partner's back is turned or he or she is not looking).

E. Weak signal - The attention getting behavior used is appropriate, but is not sufficent to gain the attention of the partner (e.g., a weak vocalization during the partner's talking; eye pointing that is minimal in duration).

## VII. Attention Getting Repairs and Revisions

The behaviors of the nonspeaker following an unsuccessful trial or attempt were further examined. Subsequent behaviors were coded as:

A. Mode Altered - The subsequent trial uses another attention getting mode.

B. Mode Repeated - The same attention getting behavior is used that occurred in the previous trial.

C. Mode Repeated and Amplified - The same attention getting behavior is used as in the previous trial, but is stronger in intensity or duration.

D. Mode Repeated With an Additional Mode - The same attention getting behavior is used as in the previous trial or attempt, in conjunction with another simultaneous mode, or placed in a combined pattern.

E. Non-Speaker Gives Up - Nonspeaker makes no further trials at gaining the partner's attention - within that attempt. Additional attempts may or may not occur later.

F. Mode Modified - Nonspeaker uses the same mode as in a previous trial, but uses it differently (e.g., points again, but in a different direction).

## TRANSCRIPTION/CODING SYSTEMS

(Light, 1983)

## CODING SYSTEM

Communicative interaction involving young nonspeaking physically handicapped children and their primary caregivers: an analysis of discourse links, communicative intent and mode of communication.

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The coding system was developed by the author to analyze the communicative interaction patterns of nonspeaking, physically handicapped children (ages 4 - 6) and their primary caregivers according to the following dimensions: discourse status, communicative intent and mode of communication. All interactions were transcribed in their entirety. The coding process involved both detailed analysis of the transcripts and repeated viewings of the videotaped interactions. The following manual describes the coding process in detail.

## I SEGMENTATION INTO DISCOURSE UNITS

The stream of interaction is segmented into discourse units of analysis: communicative turns and turn opportunity units.

Communicative turns are defined by the presence of the following behaviours directed towards the partner:

1. Use of communication board (direct or indirect selection of Blissymbols or pictures);
2. Gestures including pointing, head shake or nod, conventional signs, pantomime or idiosyncratic gestures consistently used or previously trained for use in a symbolic manner (e.g. eye gaze up as a yes response, head movement to left as a no response);
3. Speech, sound play or verbalizations which are word approximations intelligible to the listener;
4. Vocalizations accompanied by eye gaze towards the partner;
5. Eye gaze to an object or activity in conjunction with eye gaze towards the partner;
6. Vocalizations accompanied by actions (touching, selecting, reaching or holding an object); and
7. Extended eye gaze (> 1 sec.) towards an object or activity, accompanied by vocalization.

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The boundaries of a communicative turn are demarcated "by a pronounced pause in which the partner might or might not take the floor" (Kaye and Charney (1980), p.214).

In cases where the partner does take the floor as expected, the interaction is segmented into an alternating pattern of communicative turns as illustrated in the following example:

| CHILD | | ADULT | |
|---|---|---|---|
| NONVERBAL | VERBAL COMM. BOARD | VERBAL | NONVERBAL |
| looks up at adult | | 1. [WHAT ?/ | looks at child |
| gesture "two hands clasped above head" | vocalizes [bæ] ] 2. | | |
| | | 3. [BASEBALL ?/ | |
| | vocalizes [bæ] ] 4. | | |
| | | 5. [MAYBE THEY'RE GOING TO A BASE-BALL GAME ?/ | |

In cases where the partner does not take the floor as expected, he/she is said to have had a turn opportunity. Thus a turn opportunity unit is defined as the absence of a communicative turn where one is reasonably expected to occur. The criterion of reasonable expectation is defined as follows:

1. The presence of a prior communicative turn by the partner; and
2. a pause of one second or more.

(Rocissano and Yatchmink, 1983)

The literature on communicative interaction with normal children reports that between-speaker pauses (switching pauses) are typically less than one second (Garvey and Berninger, 1981). A study of the switching pauses between the caregivers' turns and the onset of all the nonspeaking children's responses in this research yielded a mean between-speaker pause of 0.69 seconds across all modes of communication across all dyads.

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## TRANSCRIPTION/CODING SYSTEMS

Thus, one second appears to be a reasonable length of time within which to expect a communicative turn. Thus, the absence of a communicative turn where one is reasonably expected is coded as a turn opportunity unit as in the following example:

| CHILD | | ADULT | |
|---|---|---|---|
| NONVERBAL | VERBAL COMM. BOARD | VERBAL | NONVERBAL |
| looks at car & doll | | [WHERE'S PETER GOING?/ | Pt. to doll in car |
| | turn opportunity unit | (pause 1.2 sec) | |
| looks at adult. | | [WHERE ARE YOU GONNA PUT HIM?/ | |
| | turn opportunity unit. | (pause 1.4 sec.) | |
| looks down at communication board. | | [IS HE GONNA - SHOW ME WHERE PETER CAN GO/ WHERE SHOULD PETER GO?/ | |

### II DISCOURSE STATUS:

Once the interaction has been segmented into discourse units (communicative turns and turn opportunity units), each unit is coded according to its status within the flow of interaction between adult and child. The coding system (figure 1) is a modification of the systems developed by Tannock (1983) and Rocissano and Yatchmink (1983). Each discourse unit is coded according to two criteria:

1. the backward links within the discourse, that is, the ways in which the participant fulfills his/her conversational obligations as established in his/her partner's prior turn; and
2. the forward links within the discourse, that is the manner in which the participant establishes expectations for his/her partner to fulfill.

#### A) Communicative Turns:

Communicative turns are subdivided into those turns that share a contextual focus with the partner's previous turn (responses) and those that do not maintain the partner's focus, but establish a new contextual focus (initiations).

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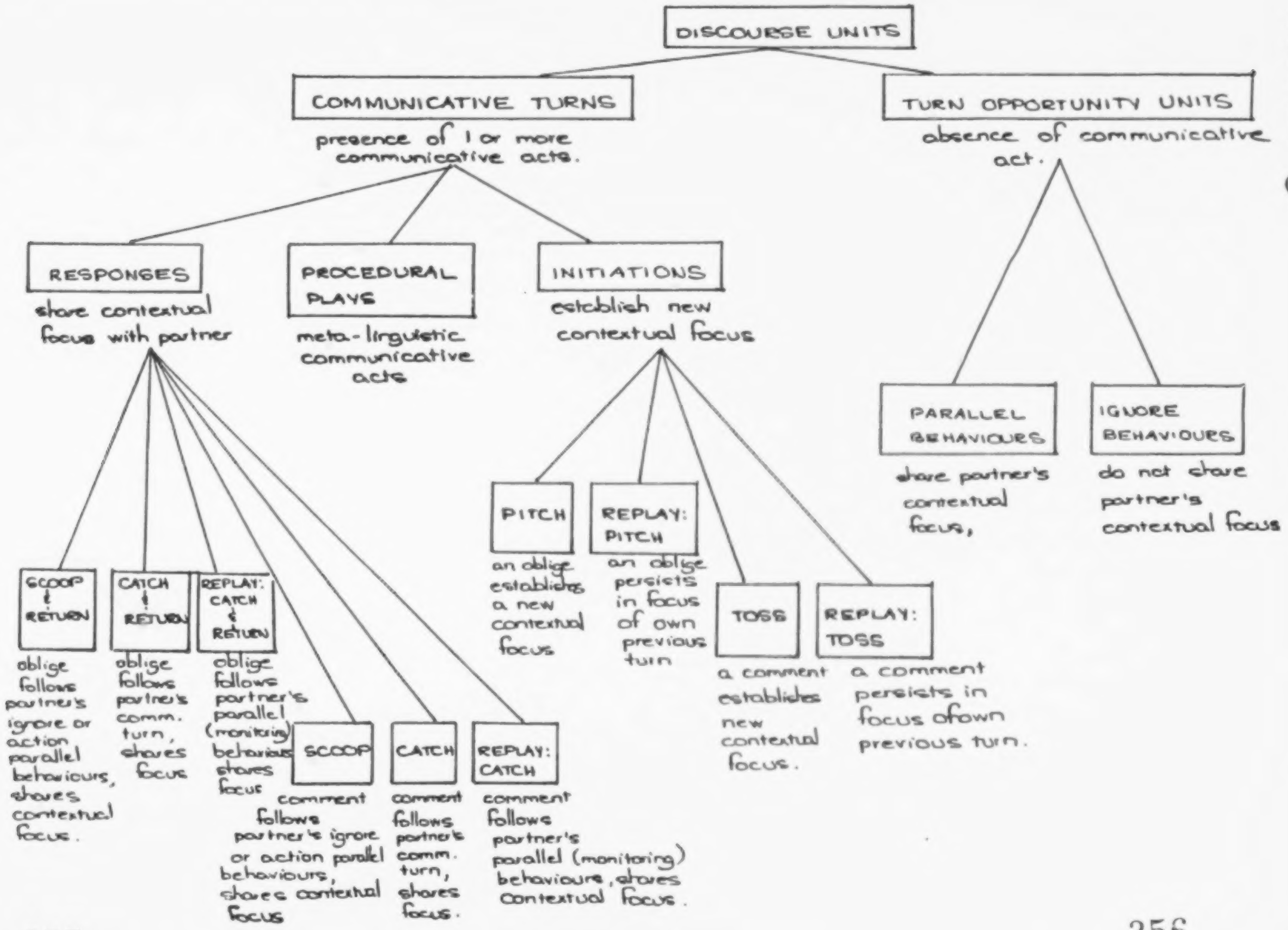
# CODING SYSTEM: DISCOURSE STATUS


DISCOURSE UNITS
COMMUNICATIVE TURNS
presence of 1 or more communicative acts.
TURN OPPORTUNITY UNITS
absence of communicative act.
RESPONSES
share contextual focus with partner
PROCEDURAL PLAYS
meta-linguistic communicative acts
INITIATIONS
establish new contextual focus
PARALLEL BEHAVIOURS
share partner's contextual focus,
IGNORE BEHAVIOURS
do not share partner's contextual focus
SCOOP & RETURN
oblige follows partner's ignore or action parallel behaviours, shares contextual focus.
CATCH & RETURN
oblige follows partner's comm. turn, shares focus
REPLAY: CATCH & RETURN
oblige follows partner's parallel (monitoring) behaviour shares focus
SCOOP
comment follows partner's ignore or action parallel behaviours, shares contextual focus
CATCH
comment follows partner's comm. turn, shares focus.
REPLAY: CATCH
comment follows partner's parallel (monitoring) behaviours, shares contextual focus.
PITCH
an oblige establishes a new contextual focus
REPLAY: PITCH
an oblige persists in focus of own previous turn
TOSS
a comment establishes new contextual focus.
REPLAY: TOSS
a comment persists in focus of own previous turn.

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## TRANSCRIPTION/CODING SYSTEMS

### 1. Initiations:

Initiations establish a new contextual focus in the interaction. Initiations are categorized according to the expectations the participant establishes for his/her partner to fulfill. Obliges are those turns which demand a response from the partner; they include requests for information, requests for objects or actions, requests for attention and requests for clarification. Comments are those turns which invite, but do not demand a response from the partner; they include comments on objects, actions or persons; confirmations or denials and provisions of clarification.

### 1.1 Pitch:

A pitch establishes a new contextual focus and demands a response from the partner (an oblige).

Turn #5 in example I below is a pitch.

Example I

| CHILD | | | ADULT | |
|---|---|---|---|---|
| NONVERBAL | VERBAL COMM. BOARD | | VERBAL | NONVERBAL. |
| looks down at wind-up toy<br>looks up at adult. | vocalizes | 1. | | looks at child. |
| | | | 2. [THAT'S FUN / | |
| eye lift up ↑ [YES] | | 3. | | |
| | | | 4. [I LIKE THAT / | |
| looks to the right at box of toys<br>Pt to toys<br>looks up at adult | (PITCH) | 5. | | |

### 1.2 Replay: Pitch:

A replay : pitch occurs when one participant persists in the focus of his/her previous turn and does not share the contextual focus of his/her/partner. A replay:pitch is an oblige which demands a response from the partner.

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Turn #3 in example 2 is a replay:pitch.

Example 2

| CHILD | | ADULT | |
|---|---|---|---|
| NONVERBAL | VERBAL COMM. BOARD. | VERBAL | NONVERBAL |
| Points to doll house<br>looks up at adult | vocalizes ] 1. | | |
| | | 2. [ THERE'S DAD | Selects doll<br>Puts doll on lap tray. |
| Looks at doll house<br>Points to doll house | vocalizes ] 3.<br>(REPLAY: PITCH) | | |

1.3 Toss:

A toss establishes a new contextual focus with a comment. It invites but does not demand a response from the partner. Turn #1 in example 3 is a toss.

Example 3:

| CHILD | | ADULT | |
|---|---|---|---|
| NONVERBAL | VERBAL COMM. BOARD | VERBAL | NONVERBAL. |
| Reaches for keys on tray. | | | Selects keys.<br>Puts keys on table.<br>Selects doll |
| | | (TOSS)<br>1. [ SHE STANDS UP<br>I THINK / | |
| Points to keys on table.<br>Looks at adult. | ] 2. | | Bends doll's legs. |
| | | 3. [ THERE / SHE'S<br>SITTIN' DOWN /<br>(REPLAY: TOSS) | |

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## TRANSCRIPTION/CODING SYSTEMS

### 1.4 Replay: Toss

A replay toss occurs when one participant persists in the focus of his/her previous turn and does not share the contextual focus of his/her partner. A replay toss is a comment as in turn #3 in example 3 above.

### 2. Responses:

Responses maintain the partner's contextual focus in the interaction. They are categorized as obliges or comments, according to the expectations the participant establishes for his/her partner.

### 2.1 Catch and Return:

A catch and return follows a partner's communicative turn and shares his/her contextual focus. A catch and return is an oblige which expects a response from the partner. Turn #3 in example 4 is a catch and return.

Example 4

| CHILD | | ADULT | |
|---|---|---|---|
| NONVERBAL | COMM. BOARD | VERBAL | NONVERBAL |
| | | 1. [CAN YOU TELL ME HOW YOU ARE TODAY?/ | looks at chil |
| looks down at Blissymbol display<br>looks up at adult. | Pt. [GOOD] 2. | | |
| | | 3. [YOU'RE FEELING GOOD/WHY ARE YOU FEELING GOOD?/ IS THERE A SPECIAL REASON?/ | |

### 2.2 Replay: Catch and Return

A replay: catch and return follows a partner's turn opportunity unit in which he/she simply monitors and attends to the interaction with eye gaze. A replay catch and return continues the contextual focus previously established in the interaction.

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A Replay: Catch and Return is an oblige, as in turn #3 in example #5 below.

| CHILD | | ADULT | |
|---|---|---|---|
| NONVERBAL | COMM. BOARD | VERBAL | NONVERBAL |
| | | 1. [LOOK AT THIS ONE!/ | Selects doll (mc |
| looks at baby doll on table | (turn opportunity unit) | 2. [WHO'S THAT?/<br>(SCOOP & RETURN) | Points to baby doll on table. |
| looks at adult. | (turn opportunity unit) | 3. [WHO'S THAT?/CAN YOU SHOW ME?/<br>(REPLAY: CATCH & RETURN) | |
| looks at Blissymbol display | Pt. [GIRL]<br>[BABY] 4. | | |

2.3 Scoop and Return:

A Scoop and Return follows a partner's turn opportunity unit and picks up on the partner's contextual focus as established in eye gaze or action. A scoop and return is an oblige, as in turn #2 in example #5 above.

2.4 Catch:

A Catch follows a partner's communicative turn and shares the focus of that turn. It is a comment and invites, but does not demand a response from the partner. Turns #2 and #4 in example #6 below are catches.

Example #6

| CHILD | | ADULT | |
|---|---|---|---|
| | | 1. [CAN YOU TELL ME HOW YOU ARE TODAY?/ | looks at child. |
| looks at symbols<br>looks at adult. | (CATCH)<br>Pt [GOOD] 2. | | |
| | | 3. [YOU'RE FEELING GOOD/WHY ARE YOU FEELING GOOD?/IS THERE A SPECIAL REASON?/ | |
| looks at symbols | Pt [SUE] 4.<br>(CATCH) | | |

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### 2.5 Replay: Catch

A Replay Catch follows a partner's turn opportunity unit in which he/she simply monitors or attends to the interaction with eye gaze. A Replay Catch shares the contextual focus established in the preceeding interaction.

A Replay Catch is a comment, as in Turn #3 in example #7 below.

Example #7

| CHILD | | ADULT |
|---|---|---|
| looks at symbols | Pt [GIRL]<br>[BABY] ] 1. | |
| looks at Mother | | 2. [A BABY GIRL/OK/I DIDN'T KNOW YOU COULD DO THAT/<br>(pause 1.6 sec) |
| eye lift up ↑ [YES] | ] 4. | 3. [I DIDN'T KNOW YOU KNEW THAT<br>(REPLAY: CATCH) |

### 2.6 Scoop:

A Scoop is a comment which follows a partner's turn opportunity unit. It picks up on the partner's contextual focus, as established in eye gaze or action.

Turn #2 in example #8 below is a Scoop.

Example #8

| CHILD | | ADULT | |
|---|---|---|---|
| NONVERBAL | VERBAL COMM. BOARD | VERBAL | NONVERBAL |
| looks at toy telephone on table. | | 1. [WHAT DID YOU DO YESTERDAY?/ | looks at child. |
| | | (pause 1.4 sec) | |
| Looks at Adult<br>Pt to telephone | ] 3. | 2. [THAT'S A TELEPHONE/<br>(SCOOP) | |
| | | 4. [WHAT D'YOU WANT?/ | |

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3. Procedural Plays:

Procedural plays are communicative turns which serve a meta-communicative function. They are primarily concerned with the communication process itself and not with the conveyance of a specific propositional content or illocutionary force. Typically, these turns are taken by adults, interacting with individuals using indirect selection to access their communication boards. Procedural plays typically occur during the child's communicative turn. Turns #3, 4 and 5 are procedural plays in example #9 below.

Example #9

| CHILD | | ADULT | |
|---|---|---|---|
| NONVERBAL | COMM. BOARD | VERBAL | NONVERBAL |
| | | 1. [WOULD YOU LIKE TO PLAY?/ | looks at child. |
| looks at symbol board | 2. ↓▽ box #4 | | |
| | \| | 3. [THIS BOX HERE?/ | Pt. box #4. |
| | (PAPER) | 4. [THIS ONE?/WHAT COLOUR?/ | Pt. box #4 |
| | \|<br>↓< purple. | 5. [PURPLE?/ | |
| looks at adult. | | | |
| | | 6. [YOU WANT SOME PAPER/ | |

B Turn Opportunity Units:

Turn opportunity units, the absence of a communicative turn, are categorized according to the contextual focus of the unit.

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4. Parallel Behaviours:

Parallel Behaviours occur when the participant shares the same contextual focus as his/her partner, but does not produce a communicative turn. Typically these units involve eye gaze towards the partner or partner's actions. The child's behaviours (a) in example #10 below are Parallel Behaviours.

Example #10

| CHILD | | ADULT | |
|---|---|---|---|
| NONVERBAL | VERBAL COMM. BOARD | VERBAL | NONVERBAL |
| looks at adult's actions. | | 1. [AND A MINIBUS/WHERE'S THE PEOPLE IN THE MINIBUS?/ | Puts bus on lap tray<br>looks at child. |
| | (a)<br>(parallel behaviours) | (pause 1.5 sec). | |
| | | 2. [MAYBE WE WON'T PLAY WITH THAT THEN EITHER/ | Puts bus on table. |

5. Ignore Behaviours:

Ignore Behaviours occur when the participant does not share the same contextual focus as his/her partner and does not produce a communicative turn despite a reasonable expectation to do so. The child's actions (b) in example #11 below are Ignore Behaviours.

Example #11

| CHILD | | ADULT | |
|---|---|---|---|
| NONVERBAL | COMM. BOARD | VERBAL | NONVERBAL |
| looks at doll house on table. | | 1. [DID YOU GO ON A MERRY-GO-ROUND?/ | Touches child's arm |
| | (b)<br>(ignore behaviours) | (pause 1.2 sec) | |
| | | 2 [YES?/DID YOU GO UP AND DOWN?/ | Touches childs arm |
| looks at Mother eye lift up ↑ [YES] | ] 3. | | |

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## III Communicative Intent: Utterance Level

Each communicative turn is coded at the utterance level according to the communicative intent or illocutionary force of the turn. Multiple utterance turns are coded with multiple communicative intents. The categories of communicative intents are as follows:

### 1. Social conventions

These turns serve the following functions:

- to greet;
- to close conversation or terminate interaction;
- to participate in social routines (e.g. how are you?, etc.).

### 2. Request for object or action

These turns direct the listener to provide an object or to perform an action. These turns serve:

- to request an object/activity present in the environment;
- to request an object/activity not present in the environment;
- to request physical assistance.

### 3. Request for information

These turns direct the partner to provide information about an object, action, person, location or event. They serve:

- to request information by offering a yes/no choice;
- to request information already known to the speaker;
- to request information unknown to the speaker.

### 4. Request for confirmation/clarification

These turns seek to verify the accuracy of the speaker's understanding of the partner's communicative turn or seek additional information regarding the previous turn. Repetitions of the previous utterance or reading of the word associated with an indicated Blissymbol, without question intonation, are not coded as requests for confirmation. This category includes turns which serve:

- to express non-comprehension of the partner's communicative turn (ie. general request for clarification, including request for
- to request additional information from the partner (ie. specific request for clarification);
- to request confirmation of symbol choices.

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## TRANSCRIPTION/CODING SYSTEMS

### 5. Request for attention

These communicative turns serve no function other than to attract the listener's attention to an object, action or to the self.

### 6. Confirmations/Denials

These turns serve:

to confirm or deny partner's understanding of symbol choices;

to confirm or deny partner's interpretation of the message;

to respond affirmatively or negatively to yes/no questions seeking information;

to agree or disagree with partner's comments.

### 7. Provision of Information

These communicative turns comment on objects, actions or persons or provide information requested by the partner. These turns serve:

to provide information (comment on objects, events, persons) in the here and now;

to provide information (comment on objects, events, persons), removed in time or space, but already known to the partner;

to provide information which is novel to the partner or imaginative in content.

### 8. Provision of clarification

These turns provide clarification when a previous communicative turn has been misunderstood by the partner. These turns serve:

to provide clarification by repeating the message without modification;

to provide clarification by changing the mode of communication;

to provide clarification by changing the content of the message;

to provide clarification by changing the mode of communication and the content of the message.

### 9. Expression of self

These communicative turns express the participant's emotional state or aesthetic opinion.

These turns serve:

to protest;

to express a negative state (displeasure, etc);

to convey humour;

to express a positive state (pleasure).

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10. Imitation/compliance

Communicative turns in this subcategory serve:

to produce signs, gestures, Blissymbols, or vocalizations in compliance with a specific directive from the partner (e.g. in response to the request "can you show me the symbol for computer?");

to read the word or voice the meaning associated with a Blissymbol chosen by the partner (this category does not include requests for confirmation produced with a rising intonation).

11. Conversational Fill

Some communicative turns, while clearly intelligible to the listner and coder, seem to carry no specific propositional content or illocutionary force. These turns serve as fillers in the interaction and include utterances such as "um-m", "ok" (used as a filler, not as an acknowledgement), etc.

12. Unintelligible/incomplete

Some communicative turns, while clearly involving communicative behaviours are unintelligible as to their propositional content or illocutionary force. Only those turns which are unintelligible to both the partner in the interaction and the coder are classified in this category.

Somce communicative turns are interrupted in mid-turn, so that the propositional content and illocutionary force of the turn are unintelligible. These turns are also classified as unintelligible.

## IV MODE OF COMMUNICATION

Each communicative turn is also coded as to its method of transmission.

A. Communication Board Mode:

1. Communication Board

Participant uses communication board or auxiliary display of Blissymbols or pictures, by means of direct or indirect selection, either alone or in combination with other modes of communication.

B. Nonboard Mode

2. Vocalization/Verbalization

Participant uses speech or vocal sound (unintelligible or intelligible).

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## TRANSCRIPTION/CODING SYSTEMS

3. Gestures/Pointing

   Participant uses conventional gesture, such as head shake or nod, pantomime, signs, or motions of limbs or body. Participant uses finger, hand or foot pointing. This category does not include pointing used as a direct selection technique to access the communication board.

4. Eye Gaze

   Participant gazes at person, object or place as a means of expression. This category does not include normal face-to-face eye contact during interaction, nor does it include eye coding used as a means to select Blissymbols. It is coded only if it occurs for an extended period of time (> 1 second) and if it occurs in conjunction with eye gaze to the partner.

5. Gesture and Vocalization

   Participant uses gesture, as defined above, in combination with vocalization.

6. Eye Gaze and Vocalization

   Participant uses eye gaze, as defined above, in conjunction with vocalization.

7. Trained Eye Gaze

   Participant uses an eye lift up, trained to convey symbolic intent, usually a yes response.

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## TRANSCRIPTION/CODING SYSTEMS

### DEFINITIONS - COMMUNICATION PROFILE

(Lossing, 1981)

### Communication Profile Code Definitions

| | |
|---|---|
| O = acquaintance | - Anyone who is known to the non-vocal individual (NVI), including friends, relatives, caregivers, daily/weekly contact persons (doctor, therapist, teacher, employer). |
| □ = stranger | - Includes store clerks, strangers entering the home or other environment with whom the NVI has not had previous contact. |
| N = non-vocal person initiated | - Communication using any one or a combination of modes which is initiated by the NVI with a communication partner or potential partner. |
| L = listener initiated | - Either a stranger or acquaintance as defined above initiates a communication which is directed at the NVI and implies a response from him/her. |
| √ = self care | - Includes those exchanges dealing with the NVI's personal self care, such as feeding, bathing, toileting, dressing, mobility, medication or therapy (self administered) transfers, etcetera. |
| ✗ = personal management | - Those exchanges which are part of shopping, social events, i.e., church, financial affairs, meal preparation for other than self, employment or vocationally related tasks, miscellaneous communication with public utilities and others. |
| Ø = gesture and verbal simultaneously | - If both verbal and gesture modes are observed simultaneously in a communication exchange, this symbol was used only when the intent of the communication could have been ascertained by either mode alone. |
| Location/Environment | - Either the location in the home or institution (bathroom, bedroom, kitchen); or various environments for the NVI within the time period, i.e., school, church, work, etc. |

Intent: The purpose or significance of a communication attempt involving the NVI being observed. Intent is divided into common reasons or purposes for communication to facilitate and categorize the recordings.

(1) Greeting: Salutations or phrases which are traditionally used when meeting or greeting another individual. Will include "Hello," "How are you?" "Hi, this is ----- speaking," etc.

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Masters thesis
University of Washington
Seattle, 1981

(2) Response - Yes/No Question: Answering or responding to a question which requires only a "yes" or "no" response on the part of either the NVI or partner.

(3) Response - Other Question: A question asked of the NVI or partner (listener) which cannot be answered with a yes/no response.

(4) Request Assistance: A request generally made by the NVI to the listener for physical assistance in self care personal management, or tasks which the NVI is incapable of performing independently.

(5) Request Information: A communication which could be initiated by either the NVI or partner that requires a response in the form of sharing information. Example would be exchanges with store clerks or other service people.

(6) Provide Information: A statement given in response to No. 5 above on the part of either the NVI or partner.

(7) Attention: A gesture, verbalization or other mode of communication initiated by either the NVI or partner to attract the attention of the other. Probably used prior to further communication exchanges or to summon assistance.

(8) Confirmation: Exchanges which take place to either seek agreement with statements made previously, or to express agreement with an opinion, occurrence.

(9) Expression of Emotional State: Those communication exchanges which are specifically intended to convey a message of the emotional state of the initiator. Examples would include, "I'm depressed, angry, sad, happy, excited," etc.

(10) Expression of Aesthetic Opinion: Those exchanges which express the initiator's opinion in response to an environmental stimulus or event, such as, "How beautiful!" or "That's terrible!"

(11) Linguistic Play: Any communication behaviors which are not for any of the above intents but are strictly for the fun of playing with words or communication. This would include word games, jokes, word puns.

(12) Don't Know: Category for the observer to record exchanges the intent of which is unknown, or the intent does not apply to those defined above.

(13) Resolving Communication Breakdowns: Those exchanges which are intended to resolve an incomplete or misunderstood statement by either party. Attempts to clarify are recorded by the observer, including mode but not intent. This will allow data to be gathered relating to the number of exchanges needed to resolve breakdowns.

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University of Washington
Seattle, 1981

(14) Still Incomplete Communication/Don't Know: This is not a category of intent, rather one in which the observer records complete communication breakdowns which are not resolved. This point is usually reached after several attempts have been recorded in which resolution was the intent.

(15) Response to Command for Physical Movement: This is an area for the recording of the non-vocal person's response to a command from the communication partner requiring a physical response. It would include such responses as moving one's wheelchair, initiating a self care activity like dressing.

## Definitions of Mode

Verbal: Those methods of communication exchanges utilizing words which are spoken by the individual, either the non-vocal person in short exchanges or by the communication partner.

Gesture: Those methods of communication which use motions of the limbs or body as a means of expression or completing the communication exchange. Gestures would be used exclusively for the exchange, not in combination with words.

Blank Columns: These modes are to be filled in by the observer/recorder/partner as necessary for the non-vocal person being observed. It is an area for recording exchanges using an augmentation system such as a Canon communicator, typewriter, paper and pencil, communication board, or others.

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Masters thesis
University of Washington
Seattle, 1981

# COMMUNICATION PROFILE SAMPLE

Sheet __ of __ Subject ID# __________

DATE __ __________

LOCATION/ENVIRONMENT __________

OBSERVER __________

COMMUNICATION PROFILE

Recorders:

____ __________
____ __________
____ __________

CODE

● = Simultaneous gesture & verbal

○ = acquaintance

□ = stranger

✓ = self care

N = non-vocal person initiated

Ø = personal management

L = listener initiated

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| TIME PERIOD RECORDED IN HOURS: | | Totals | | Totals | | Totals | | Totals |
| INTENT: ↓ MODE: → | | | | | VERBAL | | GESTURE | |
| Greetings | | | | | | | | |
| Response - Yes/No Question | | | | | | | | |
| Response - Other Question | | | | | | | | |
| Request Assistance | | | | | | | | |
| Request Information | | | | | | | | |
| Provide Information | | | | | | | | |
| Attention | | | | | | | | |
| Confirmation | | | | | | | | |
| Expression of Emotional State | | | | | | | | |
| Expression of Aesthetic Opinion | | | | | | | | |
| Linguistic Play | | | | | | | | |
| Don't Know | | | | | | | | |
| Resolving Communication Breakdowns | | | | | | | | |
| Still Incomplete Communication/ Don't Know | | | | | | | | |
| Response to command for physical movement | | | | | | | | |

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## TRANSCRIPTION/CODING SYSTEMS

(Marriner, Yorkston and Farrier, 1984)

# Transcribing and Coding Communication Interaction between Speaking and Nonspeaking Individuals

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WORKING PAPER

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## TRANSCRIPTION/CODING SYSTEMS

### INTRODUCTION

For individuals who are severely physically disabled and nonspeaking, augmentative communication systems and devices are often required to provide a means for communication. Such communication systems and devices may not be optimal for communication interaction. Researchers just beginning to address this area. Therapy programs need to be developed to teach improved communication interaction skills. Before further observations and intervention programs can be developed, reliable and valid measures of communication interaction are required.

This manual describes a technique for transcribing and analyzing conversations that occur between two speakers or between a nonspeaking and a speaking individual. It has been designed for analysis of natural and structured observations, with the nonspeaking individual using a variety of communication methods.

This manual is designed for use with a modified discourse coding system based on the work of Blank & Franklin (1980) and McKirdy and Blank (1982). The Blank & Franklin (1980) system was designed for coding and analyzing dialogue that involved preschool-age children. Their system was applied to deaf preschoolers (McKirdy & Blank, 1982).

Through the course of a dialogue, each participant in the Blank & Franklin (1980) system is seen as assuming two speaking roles. One is that of speaker-initiator (who puts forth ideas) the other is that of speaker-responder (who responds to the ideas that have been put forth). Each role is evaluated according to different scales. One set of scales is applied to what has been termed the speaker-initiator. This set involves coding an utterance for its summoning power (oblige versus comment). An utterance is a word or group of words that convey meaning. Communication with a nonspeaking individual may involve communicative behaviors, such as gestures, and these may comprise part or whole utterances for the nonspeaking person. The second set of scales is applied to what has been termed the speaker-responder. It involves coding an utterance or communicative behavior for its appropriateness relative to the utterance of the speaker-initiator.

While the basic concept of speaker-initiator and speaker-responder scales are used in this manual, considerable modifications have been made in order to use this system for interactions involving nonspeaking individuals. A number of terms used in this manual may require clarification The term nonspeaking individual/person refers to persons whose insufficient speech prevents functional spoken communication. The term augmentative communication systems refers to functional

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communication systems used by the individual who is nonspeaking. Such functional communication systems might include gestures, communication boards or microprocessor-based systems. The term communication partner refers to the person involved in communication interaction with the nonspeaking individual at a specified time. The term communication interaction refers to the communication exchanges that occur between the nonspeaking and speaking person.

This manual describes three major stages involved in preparing a transcript for analysis. They are:

1. Transcription of the communication interaction from the videotape.

2. Coding utterances as communicative or technical, and

3. Coding the communicative utterances with appropriate discourse codes.

## 1. Transcribing communication interaction from videotapes

Transcripts should reflect on paper the communication interaction that has been viewed on a videotape. Each word and meaningful gesture should be included. This manual utilizes transcription conventions developed by Miller and Chapman (1983). These conventions are fully described in the Systematic Analysis of Language Transcripts (SALT) Manual (pages 23 to 38). A number of the more relevant SALT conventions are described below. In addition the following supplementary conventions have been developed to deal specifically with some of the unique interaction behaviors of nonspeech communication.

### 1.1 Identifying the communicator

At the beginning of each transcript identify each participant. Use P to designate communication partner, S for speaking participant and N for nonspeaking participants. See page 23 of SALT manual.

### 1.2 Coding transcript duration

Enter duration in minutes:seconds (00:00) on a line preceeded by a - (hyphen). See page 24 of SALT manual.

### 1.3 Entering identification information

In order to differentiate the utterances of the 1st speaker from 2nd speaker, a $ label line, which contains an identifying label for each speaker preceded by a $ symbol, must be entered as the first line in a transcript. See page 25 of SALT manual.

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### 1.4 Coding transcriber comments

See page 27 of SALT manual. Use this notation for describing interactions that are not an integral part of the dialogue and behaviors or gestures that are not part of a conversational turn. When the participants in the conversation talk to someone else in the room, talk to themselves, and gesture or act in a manner that does not contribute to the communication, describe the behaviors and verbalizations with comment lines. By describing these extraneous interactions and behaviors in this manner they are excluded from the dialogue of interest. For example:

= N pauses to formulate message and places fingers on keyboard, but doesn't begin message preparation.
P Are there any other squares?

If a participant simply acknowledges a response (see 3.2.1) transcribe this utterance on a comment line as it does not contribute to the communication. Place the acknowledgement on a comment line, in parentheses and marked with the speaker identification code. For example:

P Do you have a red circle?
N Yes.
= (P OK).

### 1.5 Coding nonverbal utterances

See page 30 of the SALT Manual (see also section 1.13 below). For this analysis enclose communicative gestures which contribute to a speakers' turn with less than and greater than symbols < >. For example:

P Draw a green circle next to the red square.
S <draws a green circle>.
P Okay, now draw a red square to the right of the green circle.

### 1.6 End of utterance markers and incomplete utterances

All entries must end with a either a period, question mark, exclamation point or caret (. ? ! or ^). An utterance is considered incomplete when a speaker stops in mid-utterance or is interrupted. Use a ^ to indicate all incomplete utterances. Incomplete utterances may also function as questions. In such situations describe the intent of the utterance with a comment line. For example:

S So what you want to do?
P And they're right in the middle of ^
= rising intonation indicates question.
S Yeah, they're exactly in the middle.

All questions, even if only statements with rising intonation should include a question mark.

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## 1.7 Segmenting utterances for speaking individuals

In situations where there are multiple utterances per conversational turn, use the following rules to segment distinct utterances. Miller and Smith (1983) suggest the following order of application:

1. Intonation contour of the utterance
2. Pauses in the flow of speech
3. Grammatical criteria, such as independent clauses and their modifiers.

In some cases all of the above criteria will be present and segmenting the utterances will be relatively easy. In other cases all three criteria may not be present and the order above should serve to assist with making the segmentation decision. For example:

P You need to go through them first.
S A large blue square about the same amount of space as the other two.
S It takes up, uh, just a little over a third of that side.

In the above example S's utterances are segmented on the basis of the intonation contour and grammatical completeness.

Single words can constitute a utterance when they function as a communicative unit and are sequenced on either side by complete utterances with pauses before and after the single words. Single words, that function as tag on's (-isn't it, okay, sure) should be included as part of the utterance if a detectable pause is not noted between the utterance and the single word.

Single words, groups of words or phrases which are not considered communicative units are considered utterance fragments and are placed in parentheses. The term utterance fragment defines the same behaviors as Loban's (1976) concept of mazes. For this application the term utterance fragment was selected because it is more descriptive of the actual behavior. Loban (1976) indicates that when a fragment is removed from the communication unit, the remaining material should constitute a straight forward, clearly recognizable utterance. Include fragments in parentheses even if there are pauses between them and the communication unit. Use commas to designate the pause. Examples of fragmented utterances include false starts, repetitions and corrections. Such fragments appear to function as markers for formulation of a message or holding a participants turn within the conversation. Do not consider utterances that are merely abandoned or unfinished as utterance fragments.

Using the concept of utterance fragments, the following sequence,

S Now.
: 00:03.

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S UM
: 00:03.
S Okay, the three circles are in a row.

becomes

S (now, um, okay) The three circles are in a row.

## 1.8 Segmenting utterances for nonspeaking individuals

The output of most nonspeaking individuals is nonvocal (e.g. printed output, visual display, alphabet/letter board). It is therefore difficult to use pausing and rising/falling contours to designate segments. If the individual includes punctuation in the message then use it to indicate segments. If not, use the concept of communicative units. Each communicative unit consists of each independent clause with all associated dependent clauses. For example:

I'm going to get a boy because he hit me.
I'm going to beat him up and kick him in his nose and I'm going to get the girl, too.

For messages that are spelled letter by letter, indicate pauses between letters by commas. If a message is spelled and the communication partner interprets each individual letter, then the spelled letter and interpretation should be entered on separate lines. For example (codes have been omitted to illustrate punctuation):

N Would <Points to W and says would>.
P What.
N Would.
N Would.
N Would.
N W.
P W.
N O.
P O.
N U.
P U, would.

## 1.9 Delineating conversational turns

A conversational turn consists of a change from one participant to the other. Participants are designated by a letter: P for communication partner, S for Speaking participant and N for Nonspeaking partnicipant. A turn is designated by:

1) A change from P to N or S, and a change from N or S to P, or

2) A pause between one communicator's utterances of three seconds or greater, accompanied by a change in topic. A change in topic occurs when one participant changes the acknowledged

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topic of conversation and begins to talk about something else. Consider the first utterance after such a pause as the beginning of a turn, (see Section 1.9 on pausing).

See Duncan (1976, 1977) and Sacks, Schegloff and Jefferson, (1974) for a theoretical discussion of turn taking in conversation.

A special problem for delineating conversational turns may occur when individuals participate in a direction giving task (see Farrier, Yorkston, Marriner & Beukelman, 1984). Some responses will involve drawing geometric designs. Drawing as a response should only be assigned one turn, even though the turn may be continued and interrupted with verbal turns. For example:

1 P Okay <begins drawing design>.
2 = N places hands over keyboard.
3 P Red?
4 N <gestures yes>.
5 = P continues drawing.
6 = N begins message preparation.

Line 1 includes the drawing response with a verbal response, designating the drawing as part of the turn. Line 3 includes a verbal response that continues as a part of P's turn. Line 5 describes the continued drawing without designating it as an additional turn.

## 1.10 Coding pauses

Pauses should be coded when a period of three seconds or greater occurs either between successive utterances from one participant or between turns. A pause is coded when no communicative verbalization, communicative intent, gesture or action is observed from either partner.

Pauses within a speaker's turn are designated with a semicolon (;) at the beginning of the line and the duration of the pause is indicated in minutes and seconds. For example:

S I'm not sure which one to select.
; 00:20.
= S pauses to make decision.
S I think the green one.

Pauses between turns are coded with a colon (:) at the beginning of the line. Similarly the time of the pause in minutes and seconds should be designated as in the above example. SALT recognizes (:) as a signal that the speaker prior to the pause has ended the speaker turn. See page 26 of the SALT manual for further details.

## 1.11 Inserting No Responses into the transcript [NR]

A special case of pausing occurs when no answer or behavior

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is offered in response to the speaker-initiator's oblige even though the communication partner allows enough time for a response. See the sections of this manual on obliges (sections 3.11, 3.12 and 3.13).

When a no response is observed identify the communicator and insert a no response code into the transcript. For example:

P What do you think about that?
N [NR].
P Didn't you think it was a bit strange?
N <nods head>.

### 1.12 Coding communication method and output mode

Each utterance produced by the nonspeaking individual should be coded for communication method. The code for communication method should be inserted in square brackets and be included on the utterance line before the end of utterance marker. Use [1] to code speech and add additional numbers for other systems. As different augmentative communication systems and output modes are used in communication it is useful to add a comment line describing the system. For example:

N I think we should go to school [4].
= [4] designates spoken output from Morse Code system.

See section 1.5 for coding non-verbal utterances and behaviors.

### 1.13 Coding Simultaneous Turns [ST]

A simultaneous turn occurs when both participants attempt to communicate at the same time. There are three possible outcomes and coding systems:

A). When the participant interrupts a communicator, but the interruption is not successful and the communicator completes the interaction, then the interruptors message should be included in curly brackets within the communicator's turn and marked with the speaker code. The entire utterance should then be coded as a simultaneous turn [ST]. For example:

P I think you should make {N I dont want to} your bed [ST].

S A large blue square, {P which takes} about the same amount of space as the other two [ST].

B). When a participant successfully interrupts a communicator and the communicator does not complete the interaction due to the interruption then code the interrupted utterance as incomplete and the successful interruption as a simultaneous turn [ST] for the interruptor. For example:

P What should we^
N I want to have an ice cream [ST].

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C). Duncan (1977) suggests that during the smooth exchange of a speaking turn there are instances of permissible simultaneous talking. These include:

Backchannel signals: These function in a variety of ways within a conversation. They include readily identified verbalizations such as mm-hum, yeah, head nods and sentence completions. Simultaneous occurrence of back channel signals with the other speakers communication does not constitute a simultaneous turn.

Sociocentric sequences: Stereotyped expressions, typically following a substantive statement. Examples include but, uh, or something, you know. They do not add substantive information.

When these behaviors occur they should be included in braces { } within the current communicators turn without identifying the communicator or coding the turn as [ST]. For example:

P Inside of that larger square is a (small yellow) {okay} (uh), small red circle, (I mean).

For interaction involving a nonspeaking individual a simultaneous turn may occur if the communication partner begins to speak while the nonspeaking individual is preparing a message. When this occurs the message preparation is placed on a comment line. So code the communication partner's utterance as a simultaneous turn [ST]. Note that this is a variation on outcome B) above.

If a nonspeaking individual begins message preparation while a partner is speaking and/or drawing, then describe the beginning of message preparation in braces within the partner's turn as detailed in outcome A) above. The participant's turn that was interrupted should be coded as a [ST]. For example, in the following, N interrupts P (line 6) by beginning message preparation and then P (lines 7 and 9) interrupts N's message preparation.

1 N Same circle touching [3].
2 = P reads message.
3 P Same circle touching.
4 P Below that red circle?
5 N <gestures yes>.
6 P Gotcha <begins drawing> {N begins to prepare message} [ST].
7 P Is it red [ST]?
8 N <gestures yes>.
9 P Any other circles [ST]?
10 N <Holds up hand, makes eye contact>.
11 = N finishes message hands paper to P.
12 N Yellow square around small circle about same size as the bigger circle.
13 = P reads message.

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### 1.14 Coding Simultaneous States [SS]

A simultaneous state occurs when an individual begins communicating by one method and while preparing the message communicates via another method. For example, a nonspeaking individual might begin to prepare an initiation message with a spelling system with a printed output. Due to the slow rate of the system the communication partner doesn't wait until the message is complete before continuing the conversation. The communication partner might ask questions and the nonspeaking individual may respond gesturally, while continuing to prepare the message. Once a nonspeaking individual begins to prepare a message (actually hits keys on a keyboard or makes a selection from a communication board) code the nonspeaking individual's responses as a simultaneous state [SS] either until the message is complete or until the nonspeaking individual stops the message preparation.

For example:

= N begins to prepare message on Canon communicator.
S Is the triangle in the left corner [ST]?
N <gestures yes> [SS].
= N completes message and hands it to S.

Similarly a simultaneous state could occur when a speaking partner responds to a direction by drawing (action response) but simultaneously asks questions (verbal initiation).

For example:

S <begins to draw design>.
S Is the triangle in the left corner [SS]?
N <gestures yes> [ST].
= S completes design.

### 1.15 Coding Abbreviations [A]

Some nonspeaking individuals attempt to increase their efficiency through abbreviating some words. When a nonspeaking individual abbreviates words include the interpreted message within the nonspeaking persons turn and code the turn as an abbreviation. Use a comment line to describe how the nonspeaking person abbreviated the message.

For example:
N Blue red green squares [CM] [R] [A].
= B R G SQ.

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## 2. Coding utterances as communicative or technical

For certain augmentative communication systems a great number of conversational turns may be required to transfer a small amount of information.

Although conversational turns are probably appropriate for spoken interaction, they may be far too small a unit of analysis for nonspeech interaction. For example, in response to the question "What did you get for Christmas?" a speaking person (S) might answer "a new wallet". This one conversational turn might occur within a three second time period. In comparison, a nonspeaking individual (N) might respond in the following manner. (P) designates the communication partner and descriptions of the communication are included in parentheses:

N (looks at P to get attention and points to the letter A on a communication board) A.
P (repeats the letter) A.
N (points to a space on communication board).
P (says) A.
N (points to the letter) N.
P (repeats the letter) N.
N (points the letter) E.
N (points the letter) E.
P (repeats the letter) N.
N (points to the letter) E.
P (repeats the letter and guesses the word) E, a new.
N (points to letter) W.
P (repeats the letter) W.
N (points to letter) A.
P (repeats the letter) A.
N (points to the letter) L.
P (repeats the letter) L.
N (points to the letter) L.
P (asks) Do you want one or two L's?
N (points to number) 2.
P (guesses) oh, did you get a new wallet for Christmas?
N (nods head to indicate) yes.

In the above example, 50 seconds and 19 conversational turns were required. If those turns involved in message preparation and message clarification (technical turns) were eliminated and the comparison of interest was the amount of information transferred, then both the speaking and nonspeaking interactions would have transferred the same amount of information. Thus in order to specifically describe the interaction skills of nonspeaking individuals, it would seem appropriate to use a measure that provides a description of the number of turns that are required to complete each information transfer.

Technical communication, both Message Preparation and Breakdown Resolutions are not typically part of normal conversation however they appear to be a part of communication with certain augmentative communication systems. Studying the

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relationship between the number of technical turns and the number of communicative transfers of information provides a means for quantifying a number of the unique aspects of nonspeech communication. First, an index of how much a particular communication method depends on a communication partner can be obtained from comparing the number and pattern of technical message preparations (for both the nonspeaking individual and the partner) to the number of communicative transfers of information. Second, by studying the number and patterns of technical breakdown resolutions, an index of the efficiency of the interplay between the user, the communication system and the partner can be obtained.

The following definitions and codes have been developed to assist transcribers in coding utterances as communicative or technical. Every utterance should be coded as either,

Communicative [CM]
Technical Message Preparation [TMP]
or Technical Breakdown Resolution [TBR].

Table 1 provides definitions of the categories used for describing utterances involved in message preparation and breakdown (technical utterances) and compares these to communicative utterances and transfers of information.

### 2.1 Communicative Transfer of Information

The concept of a communicative transfer of information is used to decide when, and where, to code an utterance as communicative. Every utterance coded as communicative corresponds to one communicative transfer of information.

A communicative transfer of information occurs when the content of a message is understood by the partner. This can only be determined by observing the partner's reaction to the communication. For example:

P What do you want for dessert?
N Ice cream.
P Ok, chocolate or vanilla?

Each of these utterances constitutes a communicative transfer of information because each is understood and the conversation continues appropriately.

Often a transfer of information is marked by the partner restating the nonspeaking individual's message and then continuing the conversation by either elaborating the topic or changing the topic of conversation. For example:

1 P What kind of movies do you like [CM]?
2 N Horror [CM].
3 P Horror.
4 P Do you really like horror films [CM]?

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From line 4 it is clear that P understands the content of line 2 so a transfer of information has occurred and 2 is therefore coded as communicative [CM].

Note that simply restating the message does not necessarily mark the end of a transfer of information. For example:

1 P Now what should we do [CM]?
2 N Buy 2 row 1 [2] [CM].
3 = [2] printed computer output.
4 P Buy two row one.
5 P Do you want to buy two cards in the first row?
6 N <gestures no>.
7 N 2nd [2].
8 P Oh, buy the second card in the first row?
9 N <gestures yes>.
10 P Ok, I think that would work [CM].

The communicative transfer of the information in line 2 is complete after line 9, as indicated by line 10 where P continues the conversation. Lines 2 through 9 constitute a communicative transfer of information and therefore line 2 is coded as a communicative utterance [CM].

### 2.2 Communicative Utterance [CM]

An utterance is communicative if it clearly contributes to the topic and content of the conversation. For example:

P Did you bring any homework home [CM]?
N No [CM].

P Did you happen to talk about the football games coming up this weekend, huh [CM]?
N I got a bet with Phil on Dallas versus Washington [CM].

Use the concept of communicative transfer of information to determine which utterances are communicative [CM] and which are technical. This concept is especially important when the communication system used has continuous output (e.g., a manual communication board). With this type of output each element is individually produced and the overall responsibility for synthesizing the intended message lies with the communication partner. This type of communication system does not allow the user to complete an entire message before communicating it.

Continuous output communication is often one word, or one letter, at a time and the nonspeaking individual does not at any time put the entire message together. The communication partner interprets the message at some point and a communicative transfer of information occurs but there is no one utterance by the nonspeaker which can be coded as communicative [CM]. When transcribing this type of interaction insert a line at the end of the transfer of information which states the entire message as an

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utterance. This utterance is then coded as communicative [CM]. Because this is a fabricated utterance it should also be coded with a [T] to indicate that it has been added to the transcript to mark a communicative transfer of information.

In the following example N communicates the message "How we put them together to mean different things." (see 2.3 for [TMP])

1 P Why are words interesting [CM]?
2 N H [TMP] [3].
3 = [3] is eye code used to indicate letters of the alphabet.
4 P H [TMP].
5 N O [TMP] [3].
6 P O, How [TMP].
7 N W [TMP] [3].
8 P W [TMP].
9 N E [TMP] [3].
10 P E, We [TMP].
11 N P [TMP] [3].
12 P p [TMP].
13 N U [TMP] [3].
14 P U, Put [TMP].
15 N T [TMP] [3].
16 P T [TMP].
17 N H [TMP] [3].
18 P H [TMP].
19 N E [TMP] [3].
20 P E, Them [TMP].
21 N T [TMP] [3].
22 P T [TMP].
23 N O [TMP] [3].
24 P O [TMP].
25 N G [TMP] [3].
26 P G [TMP].
27 N E [TMP] [3].
28 P E [TMP].
29 N T [TMP] [3].
30 P T, together [TMP].
31 N T [TMP] [3].
32 P T, To [TMP].
33 N M [TMP] [3].
34 P M [TMP].
35 N E [TMP] [3].
36 P E [TMP].
37 N A [TMP] [3].
38 P A, Mean [TMP].
39 N D [TMP].
40 P D [TMP].
41 N I [TMP] [3].
42 P I [TMP].
43 N F [TMP] [3].
44 P F [TMP].
45 N E [TMP] [3].
46 P E, Different [TMP].
47 N T [TMP] [3].

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48 P T [TMP].
49 N H [TMP] [3].
50 P H [TMP].
51 N I [TMP] [3].
52 P I, Things [TMP].
53 N How we put them together to mean different things [CM] [T].
54 P Can you give me an example [CM]?

Note that line 53 has been added and coded as an inserted communicative utterance [CM] [T]. A communication transfer has occurred because the partner (line 54) responds to N's message by continuing the conversation.

## 2.3 Technical Message Preparation [TMP]

Code utterances as Technical Message Preparation [TMP] when they pertain to the actual message preparation. For example:

(1)
P Where does the circle go [CM]?
N Next to the red square [CM].
= P reads message.
P Next to the red square [TMP].
P <draws red square>.

In the above example the partner's reading of the message is described by a comment line, and the actual verbalization is coded as a [TMP].

(2)
P You think those phrases all the time, but you don't use them very often [CM].
N I [TMP] [3].
= [3] is eye code used to indicate letters of alphabet.
p I [TMP].
N N [TMP] [3].
P In [TMP].
N S [TMP] [3].
P S [TMP].
N P [TMP] [3].
P P [TMP].
N A [TMP] [3].
P Spanish [TMP].
N I [TMP] [3].
P I [TMP].
N T [TMP] [3].
P It [TMP].
N I [TMP] [3].
P I [TMP].
N S [TMP] [3].
P Is [TMP].
N W [TMP] [3].
P W [TMP].
N E [TMP] [3].
P E [TMP].

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N I [TMP] [3].
P Weird [TMP].
P In Spanish, it is weird [TMP].
N In Spanish, it is weird [CM] [T].

## 2.4 Technical Breakdown Resolutions [TBR]

Code an utterance as a Technical Breakdown Resolution [TBR] when it pertains to resolving a misinterpreted utterance. For example:

N First [TMP] [TBR] [4].
= [4] is combined use of alphabet board to indicate the first letter of the word and a speech attempt.
P For [TBR] [TMP].
N First [TBR] [TMP] [4].
P Spell [TBR] [TMP].

A breakdown consists of the misinterpreted utterance and all utterances which follow until the misinterpretation is resolved or the participants decide they cannot resolve it. In the above example the last three utterances clearly pertain to breakdown resolution and because N's attempt at communicating "first" is misinterpreted it is coded as the first utterance of the breakdown.

It is important to code every utterance that comprises a breakdown as [TBR]. This may include utterances that are also coded as [TMP]. Even though a message attempt may include many codes of [TMP] and [TBR] it is important to ensure that the total message is coded as communicative [CM]. Use the concept of a communicative transfer of information (see 2.1 above) and insert a communicative utterance into the transcript when the breakdown is resolved. For example see how this example from section 2.1 changes when the [TBR] codes are added.

1 P Now what should we do [CM]?
2 N Buy 2 row 1 [2] [TBR].
3 = [2] printed computer output.
4 P Buy two row one [TMP] [TBR].
5 P Do you want to buy two cards in the first row [TBR]?
6 N <gestures no> [TBR].
7 N 2nd [2] [TBR].
8 P Oh, buy the second card in the first row [TBR]?
9 N <gestures yes> [TBR].
10 N Buy 2nd row 1 [CM] [T].
11 P Ok, I think that would work [CM].

Note that if the breakdown is never resolved no communicative transfer of information occurs and therefore no utterance is inserted.

In order to resolve breakdowns both participants may introduce new topics. For example, the purpose of this sequence is to communicate the utterance 'I want to be a linguist'.

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1 = N has communicated "I want to be a leng".
2 N <gestures no> [TBR].
3 P I want to be a [TBR].
4 P Leng is ling [TBR].
5 N U [TMP] [TBR] [3].
6 P U [TMP] [TBR].
7 N S [TMP] [TBR] [3].
8 P S [TBR] [TMP].
9 P Does it have something to do with language [TBR]?
10 N <gestures yes> [TBR].
11 P An interpreter [TBR]?
12 N <gestures no> [TBR].
13 P I want to be a leng [TBR].
14 P I want to be a leng [TBR].
15 N S [TMP] [TBR] [3].
16 P S [TMP] [TBR].
17 N T [TMP] [TBR] [3].
18 P T [TMP] [TBR].
19 N U [TMP] [TBR] [3].
20 P U [TMP] [TBR].
21 N D [TMP] [TBR] [3].
22 P Study [TMP] [TBR].
23 N O [TMP] [3] [TBR].
24 P O [TMP] [TBR].
25 N F [TMP] [3] [TBR].
26 P Of [TMP] [TBR].
27 N L [TMP] [3] [TBR].
28 P L [TMP] [TBR].
29 N A [TMP] [3] [TBR].
30 P A [TMP] [TBR].
31 N N [TMP] [3] [TBR].
32 P N [TMP] [TBR].
33 N G [TMP] [3] [TBR].
34 P Languages [TMP] [TBR].
35 P You want to study more languages [TBR].
36 P The study of languages [TBR].
37 P I should know what that word is [TBR].
38 P I should [TBR].
39 N <gestures yes> [TBR].
40 P Do I know what that word is [TBR]?
41 : 00:20.
42 N P [TMP] [TBR] [3].
43 P P [TMP] [TBR].
44 N A [TMP] [TBR] [3].
45 P A [TMP] [TBR].
46 N U [TMP] [3] [TBR].
47 P Paul Schwejda [TMP] [TBR].
48 P Is it something Paul Schwejda does [TBR]?
49 N <gestures no> [TBR].
50 P Paul Schwejda [TBR].
51 P Oh, he told you what the word was [TBR].
52 N <gestures yes> [TBR].
53 P Well then, you're having this conversation with the wrong person [TBR].

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54 P You need to go talk to Paul [TBR].
55 : 00:20.
56 N P [TBR] [3].
57 P A person who studies languages, a linguist [TMP] [TBR].
58 N <gestures yes> [TBR].
59 N I want to be a linguist [CM] [T].
60 = (P Okay).
61 P You'd like to be a linguist and study where words come from [CM].

Lines 1 through 60 represent a sequence which contains message preparation and breakdown resolution utterances. Some of these utterances represent instances where both P and N introduce new concepts or information in an attempt to resolve the breakdown, however these utterances have been coded as part of the breakdown rather as communicative utterances. Lines 59 through 61 provide an example of the end of a breakdown and the elaboration of a topic.

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# Coding Technical and Communicative Utterances

## Communicative Utterances [CM]

An utterance is communicative if it clearly contributes to the topic and content of the conversation. In nonspeech communication a number of technical message preparations and breakdown resolutions may be required to produce a communicative utterance. Use the concept of a communication transfer of information to decide where to insert communicative utterances into a transcript.

## Communicative Transfer of Information

A communicative transfer of information occurs when a message is completed. It can be determined by observing the partner's reaction to the communication.

## Technical Utterances

### Technical Message Preparation [TMP]

Utterances or gestures that pertain to the interpretation of a message are coded as Technical Message Preparations [TMP]. For example, a nonspeaking person using an alphabet board to communicate a message spells each letter of the message. All turns actually involved in the spelling of the message are coded as message preparations [TMP]. The communication partner's interpretation of the letters or message is also coded as a message preparation.

### Technical Breakdown Resolutions [TBR]

Code an utterance or gesture as a Technical Breakdown Resolution [TBR] when it pertains to resolving a misinterpreted utterance or technical message preparation. For example, if a communication partner misinterpreted a nonspeaking individual's attempt to spell a letter on the alphabet board then all the utterances related to overcoming the breakdown are coded as breakdown resolutions [TBR].

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## 3. Coding the communicative turns with appropriate discourse codes

Each communicative turn is coded with discourse codes. If the turn contains more than one utterance the code is placed on the final utterance of the turn. The discourse codes constitue a modified version of the Blank & Franklin (1980) coding system for analyzing the dialogue of preschoolers. Throughout the course of a dialogue each participant is viewed as assuming two speaking roles - that of speaker-initiator or speaker-responder. The scale that is used depends upon whether the speaker is initiating an exchange or responding to the other person's initiation. As initiator, a speaker's utterances are judged for their level and type of "summoning power" (i.e., for their explicitness of a demand for a response.) As responder, a speaker's utterances and behaviors are judged for their appropriateness and complexity.

Analysis of the coded dialogue allows one to capture important characteristics of verbal interchange. For example, in hierarchical relationships (e.g., teacher-pupil) it is common for the dominant person to control the dialogue by asking questions and issuing commands (i.e., by using obliges). The subordinate person does not have these privileges, but is expected to respond. By contrast, in a less power-dominated interchange (e.g., conversation between peers), both participants have the "right" to freely initiate topics and extend the conversation. This more symetrical relationship would be reflected in the the analysis of a coded transcript because it would reveal more equal sharing of the initiation and responding roles.

### 3.1 Speaker-initiator scale

The speaker or participant who is leading the dialogue is designated as the speaker-initiator. In addition a turn is considered an initiation when it is the first turn of the conversation, follows a pause and change in topic (designated by :) or when it follows a No Response. Initiations are divided into obliges (restricted and unrestricted) and comments. Obliges are those utterances which through words, tone or gestures explicitly convey the expectation that the listener reply. Commonly they are expressed as questions or commands although they need not take this form. See Table 2 for definitions and examples of the speaker-initiator scale.

### 3.1.1 Unrestricted obliges [UO]

Obliges are considered unrestricted when they place no restrictions on the type or number of possible responses that may be rendered. Examples include:

P How can we figure this out [CM] [UO]?
S I dont know.

P What happened today [CM] [UO]?
S Nothing much.

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### 3.1.2 Restricted obliges [RO]

If an oblige contains a request for affirmation or negation, or presents the responder with only a limited number of response choices, then it is coded as a restricted choice oblige [RO].

Negative-affirmative responses may be expressed by such forms as "right, okay, sure" as well as "yes" and "no." For example:

P Will you take the jacket in anywhere [CM] [RO]?
S No.

These types of obliges may also occur as commands that require a specified action to be performed. For example:

P Is it a square or circle [CM] [RO]?
N (draws square).

The concept of unrestricted and restricted obliges appears to be somewhat task dependent. For example in the direction giving and shared decision making tasks described by Farrier, Yorkston, Marriner & Beukelman (1984) the following obliges would be coded as restricted [RO].

| | |
|---|---|
| What color do you have? | (3 possible colors) |
| What shape is it? | (2 possible shapes) |
| In which corner is it located? | (4 corners) |

These same obliges in a conversational task that did not have a small (3-4) restricted number of answers would be coded as unrestricted obliges.

### 3.1.3 Comments [CO]

Comments are those utterances which fail to contain any explicit demand that a response be forthcoming. This does not mean that a response is unexpected. Generally, it is assumed that the responder on his/her own initiative will contribute to the dialogue. Indeed this behavior is so taken for granted that the speaker-initiator feels no need to make an explicit demand for a response.

An utterance may simultaneously contain both a comment and an oblige (e.g. this is nice, don't you like it?). Since the presence of the oblige places a demand upon the other person to respond, it is seen as dominating the tone and intent of the particular utterance. Therefore, coding for its summoning power, this type of utterance is considered an oblige.

Examples of comments:

P I can't believe that Betty worked with him for that long without

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knowing he had seizures [CM] [CO].
N I think it is so stupid.

P I cut out your skirt today [CM] [CO].
N Good, thank you.

### 3.2 Speaker-responder scale

Once a communicator's utterance has been coded as an initiating oblige or comment the next judgement is to code the other communicator's response. Responses to obliges and comments are coded as Adequate [R], Elaborative [ER], No response [NR], Ambiguous [AM], Response to Comments [RC] and Recodes [RE]. See Table 3 for definitions and examples of the speaker-responder scale.

### 3.2.1 Adequate Responses [R]

A response which appropriately meets the demand of the speaker initiator's oblige, but does not elaborate or extend the topic or conversation is coded as an adequate response [R].

For example:
P So what did you do for Christmas Steve [CM] [RO]?
N I got a brand new wallet [CM] [R].

P Did you ever think things like that [CM] [RO]?
N Yes [CM] [R].

An acknowledgement of an initiation should also be coded as an adequate response. For example:

P Oh, John [CM] [RO].
S Yes [CM] [R].

Note that acknowledgements of a response should be placed on comment lines (see section 1.4) with a speaker identification code in parentheses, and not coded.

For example:
P How are a knife and scissors the same [CM] [UO]?
S They both cut [CM] [R].
= (P ok).

### 3.2.2 Elaborative Responses [ER]

An elaborative response [ER] occurs when the response goes beyond the literal meaning or requirement to expand the topic or conversation. For example:

P Well, is it short in back [CM] [RO]?
S No, its pulled back and tied with a lot of different colored ribbons [CM] [ER].

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### 3.2.3 Response to Comments [RC]

Responses to comments are differentiated from responses to obliges because comments place fewer constraints on the responder. Initiating comments do not contain the explicit demand that the other person respond. Hence, in offering a response to this type of initiation, the responder is demonstrating an independent effort to sustain the conversation.

P You listened to it six times last night [CM] [CO].
N Eight more times to listen [CM] [RC].

### 3.2.4 Ambiguous Response [AM]

An ambiguous response [AM] is one which is unclear, so that one cannot determine if the responder understands the content of the initiating utterance. For example:

P What's on your shoe [CM] [UO]?
N Brown [CM] [AM].

### 3.2.5 Responses that are recoded [RE]

Utterances that are coded as obliges contain the clear expectation that a response will be forthcoming. The responder, in replying to an oblige, is simply meeting the demand that has been imposed and is evaluated on the response scale. But if the response also includes an initiating oblige the utterance is first coded on the speaker-responder scale and then recoded on the speaker initiation scale. Responses to obliges are recoded only when the response is also an initiating oblige. Place the [RE] code between the response and the initiation codes. For example:

P What do you think of Reagan [CM] [UO]?
S More to the point, what do you think [CM] [RE] [UO]?

P Do you want some more cucumber [CM] [RO]?
S No, I want peach [CM] [R] [RE] [RO].
P Okay [CM] [R].
S I want it in a bowl [CM] [RO].

Ⓒ Marriner, Yorkston and Farrier, 1984

Table 2
Speaker Initiator Scale
This scale applies to the utterances of the person who at a particular point in time is leading the dialogue.

| TERM | DESCRIPTION | EXAMPLE |
|---|---|---|
| RESTRICTED OBLIGE [RO] | Speaker-initiator obliges that present the responder with a situation in which he/she must choose from a limited set of responses, or when in command form, perform a particular action specified by the speaker-initiator. | P Do you have a red square?<br>(only red, green & yellow are possible)<br>P Is it red?<br>N Yes. |
| UNRESTRICTED OBLIGE [UO] | Speaker-initiator obliges that present the responder with a situation in which he/she has no restrictions upon type or number or possible responses. | P How can we figure this out?<br>P What cards do you have?<br>P What do you want to buy back? |
| COMMENTS [CO] | Speaker-initiator behaviors which fail to contain any explicit demand that a response be forthcoming. This does not mean that a response is unexpected. It is assumed that the responder on his/her own initiative will contribute to the dialog. | P We can't buy the two squares because I don't have the blue one.<br>N We could buy back the three-pointer to get it. |

KEY: P communication partner
N nonspeaking individual

ⓒ Marriner, Yorkston and Farrier, 1984

Table 3
Speaker Responder Scale
This scale applies to utterances from the person who at a particular point in time is responding or expected to respond to the speaker-initiator.

| TERM | DESCRIPTION | EXAMPLE |
|---|---|---|
| ADEQUATE RESPONSE [R] | A response that appropriately meets, the demand of the speaker-initiator's oblige but it does not elaborate or extend the topoic or conversation. | P Do you have any blue squares?<br>N No. |
| ELABORATIVE RESPONSE [ER] | A response that goes beyond the literal meaning or requirement to expand the the topic or conversation. | P Do you have any blue squares?<br>N No I dont, but I I have two green circles. |
| AMBIGUOUS RESPONSE [AM] | A response that is unclear, so that one cannot determine if the responder understands the content of the initiating utterance. | P What's on your shoe?<br>N Brown. |
| RESPONSE TO COMMENT | A special response category for responses to comments, created because they place fewer constraints on the responder. | P I don't like it.<br>N I don't either. |
| RECODED RESPONSE [RE] | A response to an oblige that that becomes an initiating oblige. | P Do you have any blue squares?<br>N No, do you have any red squares? |

KEY: P communication partner
N nonspeaking individual

ⓒMarriner, Yorkston and Farrier, 1984

(Wexler, 1983)

VARIABLES USED IN SYSTEM OF ANALYSIS

The following variables were used with each "speaker" for analyzing nonspeaking/ speaking conversations with and without a manual communication aid.

I. Number of initiations

II. Number of complex C-acts

III. Number of C-acts of each general class

1. Requests (RQ)
2. Responses (RS)
3. Statements (ST)
4. Acknowledgements (AC)
5. Organizational Devices (OD)
6. Uninterpretable (unintelligible) C-acts (UN)

IV. Number of C-acts of each specific type

REQUESTS:

1. Yes/no requests (RQYN)
2. Choice requests (RQCH)
3. Product requests (RQPR)
4. Process requests (RQPC)
5. Action requests (RQAC)

RESPONSES:

6. Yes/no responses (RSYN)
7. Choice responses (RSCH)
8. Product responses (RSPR)
9. Process responses (RSPC)
10. Compliances (RSCO)
11. Contingent query responses (RSCQ)

STATEMENTS:

12. Identifications (STID)
13. Descriptions (STDC)
14. Procedurals (STPR)
15. Evaluations (STEV)
16. Internals (STIN)
17. Explanations (STEX)

ACKNOWLEDGEMENTS:

18. Acceptances/Agreements (ACAC)
19. Repetitions (ACRP)
20. Summaries (ACSM)
21. Expansions (ACEX)
22. Guesses (ACGS)

ORGANIZATIONAL DEVICES:

23. Boundary markers (ODBM)
24. Contingent queries (ODCQ)
25. Rhetorical questions (ODRQ)
26. Politeness markers (ODPM)
27. Recalls (ODRE)

MISCELLANEOUS:

28. Uninterpretable (unintelligible) C-acts (UNTP)

IV. Number of C-act types

V. Proportion of compostie C-acts out of all C-acts.

ⓒWexler, 1983

| CONVERSATIONAL ACT CLASS | CODE | C-ACT DEFINITION | EXAMPLES: SPEAKING | NONSPEAKING |
|---|---|---|---|---|
| **REQUESTS** to solicit information, action, or acknowledgement | RQYN | yes-no questions: seek true-false propositions (with the introduction of new subject or predicate information). Can be conveyed by canonical form, rising intonation, or within turn tag. | * Did you hear what he ended up having?<br>* That was Sunday?<br>* You still hang out with the Yankees, huh? | (D)<br>D<br>(O)<br>Do<br>(you)<br>you<br>(like)<br>like<br>(F)<br>F<br>(O)<br>O<br>(O)<br>O<br>(T)<br>Football?<br>* Do you like football? |
| | RQCH | choice questions: seek selection of two or more alternatives. | * Does your system take tape or records? | |
| | RQPR | product questions: seek specific information relative to most "WH" interogative pronouns; typically require brief responses of one to three words. | * What team was playing the Mets? | (What)<br>what<br>(I)<br>is<br>(you)<br>your<br>(F)<br>favorite<br>(T)<br>team?<br>(YES)<br>* What is your favorite team? |
| | RQPC | process questions: seek open-ended or extended descriptions or explanations; typically require longer, more elaborate responses. | * What does that tell you? | * (W-H-Y)? |
| | RQAC | action requests: solicit a listener to perform (or cease) an act or process. | * Tell me a little about the school? | (S)<br>S<br>(A)<br>A<br>(Y)<br>say<br>(S)<br>S<br>(O)<br>Say some'm to Jeremy?<br>(YES)<br>* Say something. |

## APPENDIX E (cont'd)

| CONVERSATIONAL ACT CLASS | CODE | C-ACT DEFINITION | EXAMPLES: SPEAKING | NONSPEAKING |
|---|---|---|---|---|
| **RESPONSES**<br>provide information directly complementing prior request | RSYN | yes-no answers: supply true-false judgements of propositions. | (Do you like football)<br>* You bet. | Are they getting a lot of runs themselves?<br>(N)<br>N<br>/nou/ (O)<br>No<br>* No |
| | RSCH | choice answers: supply responses to choice questions. | NONE FOUND IN CORPUS | Yes or no.<br>*(YES) |
| | RSPR | product answers: provide "WH" information requested by product questions. | Which trips have you made with us?<br>* You went to the Giant training camp. | Who's in first right now-in their division?<br>(M)<br>M<br>(O)<br>O<br>/---/ (XXX)<br>Let's see<br>How do you spell Montreal?<br>Montreal, right?<br>(YES)<br>* Montreal |
| | RSPC | process answers: provide solicited explanations, elaborations, etc. | (W-H-Y)?<br>* Well, I never liked them. | What was it about Number 99 that impressed you?<br>(He)<br>He<br>(was)<br>was<br>(H)<br>H<br>(I)<br>I<br>(T)<br>T<br>(ing)<br>ing<br>hitting<br>He was hitting<br>(hard)<br>hard<br>* He was hitting hard |

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APPENDIX E (cont'd)

| CONVERSATIONAL ACT CLASS | CODE | C-ACT DEFINITION | EXAMPLES: SPEAKING | NONSPEAKING |
|---|---|---|---|---|
| **RESPONSES** | | | | |
| | RSCO | compliances: Signals acceptance, denial, or acknowledgement of a prior action or permission request (doing of the requested act constitutes compliance). | ((NV points to book)).<br>You want me to get the book<br>(YES)<br>Oh<br>* OK ((getting up)) | You wanna wipe your mouth↑<br>* ((NV takes tissue and wipes mouth)). |
| | RSCQ | clarifications: supply the relevant repetition, confirmation, etc., requested by a clarification query (ODCQ); used to clarify the form of a preceding C-act. | NONE FOUND IN CORPUS | You had a good...<br>/ʌ/<br>one↑<br>(X)<br>You had a good what↓<br>* /ʌvəʔʌ/<br>overnight↑<br>(YES)<br>You had a good over-night.<br>/jɛ/ (YES)<br>I had a good overnigh. |

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APPENDIX E (cont'd)

| CONVERSATIONAL ACT CLASS | CODE | C-ACT DEFINITION | EXAMPLES: SPEAKING | NONSPEAKING |
|---|---|---|---|---|
| **STATEMENTS**<br>express facts, rules, attitudes, feelings, beliefs, etc. | STID | identifications: identify proposition or elements which can be synthesized at some later point in the conversation to form a proposition (composite C-act). May consist of items identified (e.g., pointed to) on a communication board, or letters, words, or phrases produced orally (unless unintelligible) or manually (in the case of fingerspelling or manual signing). | *That's our subject. | Am I supposed to uh- guess what our first subject is going to be<br>(NO)<br>*(G)<br>G<br>("I MADE A MISTAKE I'M STARTING OVER)<br>Starting over.<br>*(F)<br>F<br>*(Football)<br>F-football<br>*Footoall |
| | STDC | descriptions: predicate events, properties, locations, etc. of objects or people. | *I was watching that middle linebacker. | /əI ɛm ɛbu u ɡoʊ ə mauv/<br>((nodding)) to go out.<br>/ba maɪʃu/<br>by yourself<br>/jɛs/<br>*I am able to go out by myself. |
| | STPR | procedurals: express social-behavioral rules and procedures or provide directive information concerning imminent sequences of talk or action. | *As soon as we're finished we'll go down and have some lunch. | (Change)<br>Change<br>(activities)<br>activities↑<br>You want to change the subject↑<br>(YES)<br>*Change activities |
| | STEV | evaluations: express attitudes, judgements, etc. | *It was a beautiful day yesterday.<br>*That was easy enough. | (Y)<br>Y<br>(O)<br>O<br>(U)<br>U<br>You<br>(S)<br>S<br>(H)<br>H<br>(O)<br>You should.<br>(YES)<br>*You should |

APPENDIX E (cont'd)

| CONVERSATIONAL ACT CLASS | CODE | C-ACT DEFINITION | EXAMPLES: SPEAKING | NONSPEAKING |
|---|---|---|---|---|
| **STATEMENTS** | STIN | internals: express emotions sensations, mental events, etc. Includes intents to perform future acts and attributions where the speaker reports belief about another's internal state. | *I hate it.<br>*If there's a lot of snow this winter I'm liable to just pick up and leave.<br>*I know you enjoyed it. | (I)<br>I<br>(like)<br>like<br>(to)<br>to<br>(have)<br>have<br>(A)<br>A<br>(L)<br>L<br>(O)<br>O<br>(T)<br>A lot↑<br>(YES)<br>You like to have a lot of money↑<br>(YES)<br>*I like to have a lot |
|  | STEX | explanations: express reasons causes, predictions, conclusions, and interpretations. Can include definitions and hypothetical/conditional statements. | *It's gonna take some time to figure out.<br>*Because you could still read the book. | (I)<br>I<br>(have)<br>have<br>(friend)<br>a friend<br>(S)<br>friends<br>(here)<br>here<br>(but)<br>but<br>(they)<br>they<br>(can)<br>can<br>(not)<br>not<br>(read)<br>read<br>(my)<br>my<br>(board)<br>board<br>*I have friends here but they cannot read my board. |

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## APPENDIX F (cont'd)

| CONVERSATIONAL ACT CLASS | CODE | C-ACT DEFINITION | EXAMPLES: SPEAKING | NONSPEAKING |
|---|---|---|---|---|
| **ACKNOWLEDGEMENTS**<br>recognize and evaluate responses and nonrequestives | ACAC | acceptances/disagreements: neutrally, positively, or negatively recognize answers or nonrequestives or other acknowledgements. Can also be used to indicate that the the interpretation or acknowledgement of a previous utterance was not correct. (An individual can acknowledge his own contribution). | • yes<br>• oh<br>• no<br>• wrong<br>I should brand myself?<br>• Nah | /dI/ (XXX)<br>today?<br>• /nou/ (NO)<br>So they're three games behind Pittsburgh.<br>*(YES) |
|  | ACRP | repetitions: immediate repetition of letters, words, or phrases of the previous utterance: typically used as a communicative check or means of verification of accuracy of form or content of previous message. Can include self repetitions (not confined to immediate prior turn) and partial immediate repetitions where the attempt is to immediately repeat. | (I)<br>*I<br>(B)<br>*B<br>(M)<br>*M<br>[illegible]/<br>*I bet you don't know where something is. | Cousin is C-O-U<br>S<br>*(S)<br>I<br>*(I)<br>N<br>*(N) |
|  | ACSM | summary: synthesis or paraphrase of individual parts of a message segmented over time (more than two turns); incorporates material previously produced. | (Remember)<br>Remember<br>(When)<br>When<br>(J)<br>J<br>(O)<br>O<br>Joe<br>• Remember when Joe... | NONE FOUND IN CORPUS |
|  | ACEX | expansions: acknowledge a partially completed word, phrase, or sentence by completing the remaining units or extending a main clause by adding new information of a lesser order than a new subject or predicate May be grammatically expanding a syntactically less complex utterance by filling in a slot left uncompleted or further specifying the literal meaning of the preceding act. | (C-O-M-M-U-)<br>• communication board<br>/mm/ (YES)<br>My friend is staying with me<br>• At your house?<br>(YES)<br>How do you like the weather?<br>/n::/<br>N<br>(O)<br>No<br>• Not so much. | Some of them are nonverbal also.<br>(just)<br>just<br>(John)<br>John<br>(and)<br>and<br>(Mike)<br>• Just John and Mike |

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## APPENDIX E (cont'd)

| CONVERSATIONAL ACT CLASS | CODE | C-ACT DEFINITION | EXAMPLES: SPEAKING | NONSPEAKING |
|---|---|---|---|---|
| ACKNOWLEDGEMENTS | ACUG | guesses: attempts at specifically acknowledging a C-act which is unintelligible or which does not meet criteria for interpretability. Can occur as other than acknowledgement of immediately preceding utterance. | How many do you think?<br>/ɛʌʔʌ/<br>*thirty<br>(NO)<br>/I/<br>In..<br>(NO)<br>*To?<br>(YES) | NONE FOUND IN CORPUS |
| ORGANIZATIONAL DEVICES regulate contact and conversation | ODBM | boundary markers: indicate openings, closings, and changes in topic. Can include fillers which serve to maintain floor for speaker (as separate acts; not within act fillers), attention getters, name saying and expletives. | *Hi.<br>*Bye.<br>*By the way.<br>*OK<br>*Hmm<br>*Uh oh!<br>*Roseann. | Does your system take tapes or records?<br>*/wɛ/ (well)<br>/boʊ/ (both) |
|  | ODCQ | contingent queries: directly or indirectly convey a request for clarification of the form of the prior speaker's production with no new subject or predicate information produced. Applies to transmission of the form of message and subsequent need for clarification of that form. Includes specific and nonspecific clarification requests. | You a cartoon freak?<br>(XXX)<br>*Huh?<br>*Are you?<br>What team do you keep up with?<br>/---/<br>*Who?<br>Which friends are out there?<br>/--/<br>*Say again ((moving closer)) | NONE FOUND IN CORPUS |
|  | ODRQ | rhetorical questions: seek an acknowledgement from a listener sometimes used to allow the speaker to continue. Can also include questions to which the answer is not expected or self addressed questions and statements used during episodes of self-talk. May be used as a form of humor. | *You know what I did?<br>*You know?<br>Hmm<br>*What else did I learn?<br>*Now you're gonna try and talk to me? ((laughs)). | NONE FOUND IN CORPUS |
|  | ODPM | politeness markers: indicate ostensible politeness. | *Sorry. | NONE FOUND IN CORPUS |
|  | ODRE | recalls: serve as reminders/ place holders in order to maintain or mutually establish the status of a proposition during the process of its formulation. | (L)<br>L<br>(A)<br>A<br>(S)<br>S<br>Last?<br>(YES)<br>*Last... | NONE FOUND IN CORPUS |

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## APPENDIX E (continued)

| CONVERSATIONAL ACT CLASS | CODE | C-ACT DEFINITION | EXAMPLES: SPEAKING | NONSPEAKING |
|---|---|---|---|---|
| MISCELLANEOUS CODES | UNTP | uninterpretable: unintelligible or incomplete C-acts. | * ((shaking head)) He has-<br>* Do you catch a- | */ʌ/<br>I↑<br>(NO) |
| CODE TAGS<br>Identify aspects of C-acts which occur across various C-act types | CK | check: acknowledgements which convey by their marked intonation pattern that in addition to acknowledging a preceding act by repeating, completing, guessing, etc., the listener is checking on the exact status of the acknowledgement. May include things like expanding, correcting, and specifying. Applies to tag questions. | your friend...<br>(Chris)<br>* Chris↑<br>/i/ (P)<br>P<br>/hʌ/ (H)<br>H<br>/a/ (I)<br>I<br>/ɛ/ (L)<br>L<br>* Phillies, huh↑ | NONE FOUND IN CORPUS |

### CODES FOR OBSERVABLE PHYSICAL BEHAVIORS

| | |
|---|---|
| GEST-PT | Pointing |
| GEST-TCH | Touching |
| GEST-RCH | Reaching |
| GEST-SYMB | Symbolic/Emblematic |
| HEAD-N | Head Nod |
| HEAD-SH | Head Shake |
| HEAD-M | Head Movement(described) |
| POST | Postural Change |

| | |
|---|---|
| FACE-S | Smile |
| FACE-F | Frown |
| FACE-NA | No affect |
| MOUTH-M | Movement (sileny) |
| MOUTH-OP | Mouth Opening |

| | |
|---|---|
| EYES-PT | Eye Point |
| EYES-BL | Eye Blink (communicatively) |
| EEC | Establishes Eye Contact |
| REC | Removes Eye Contact |
| VOC | Vocalization (general) |
| VOC-L | Laugh |
| VOC-EXC | Exclamatory (shriek, yell, etc.) |
| VOC-AI | Audible Inhalation |

MODES

GEST - gestural
VOC - vocal
ACA - augmentative communication aid

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# APPENDIX E

## Clinical Observation Forms and Questionnaires: Interaction with Augmented Communicators

Clinicians and researchers are attempting to develop observation checklists and questionaires which are useful in clinically evaluating communication interaction between augmented speakers and those they communicate with. These clinical forms provide a way of observing behavior in a particular setting, and noting the presence or absence of behaviors, problem areas, and how that communication takes place. Appendix E contains clinical forms and some questionaires contributed to the IPCAS study. Additional published forms relating to nonspeakers can be found in Mills and Higgins (1984), and Carlson (1982). Observational checklists developed for other populations have also been applied to this population (e.g., Wollner and Geller, 1982; Prutting and Kirchner, 1983), along with formal tests which look at communication success and social functions of interaction (e.g., Wiig, 1982; Holland,1980). The questionaires contributed by Buzolich were used in her dissertation study to look at social validity. She was particularly interested in the communication impressions made by nonspeakers, and how this related to specific behaviors that were observed.

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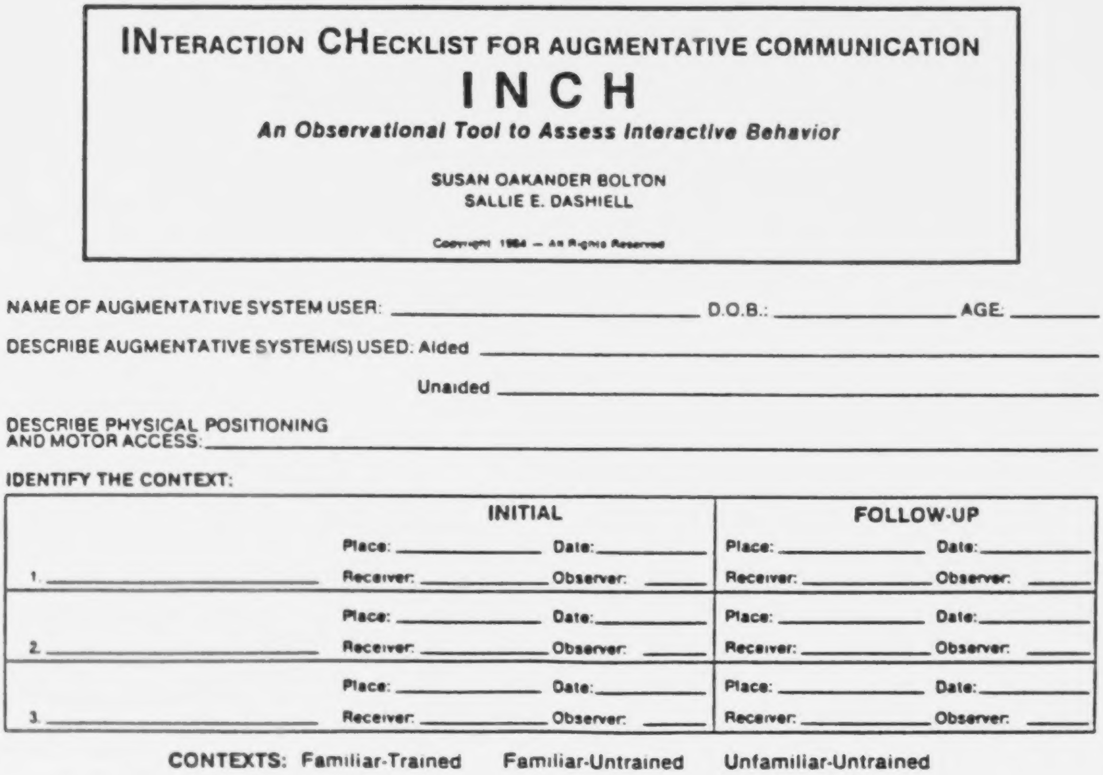
2. Buzolich, M., Questionaire For Observers: Forced Choice Judgements, (UP-1983)..................................................

3. Buzolich, M., Questionaire For Observers: Scaled Competency Measures, (UP-1983)..................................................

4. Eddins, C., and Fleming, M., Communicative Behavior Inventory, (UP-1984)..................................................

5. Mills, J., and Higgins, J., Interactive Assessment (From Non-Oral Communication Assessment, 1983)..................................

6. Wasson, P., Conversation Intent Inventory: Goal Placement Survey, 1984....................................................



## INTERACTION CHECKLIST FOR AUGMENTATIVE COMMUNICATION

## I N C H

***An Observational Tool to Assess Interactive Behavior***

SUSAN OAKANDER BOLTON
SALLIE E. DASHIELL

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NAME OF AUGMENTATIVE SYSTEM USER: ____________ D.O.B.: ________ AGE: ______

DESCRIBE AUGMENTATIVE SYSTEM(S) USED: Aided ____________

Unaided ____________

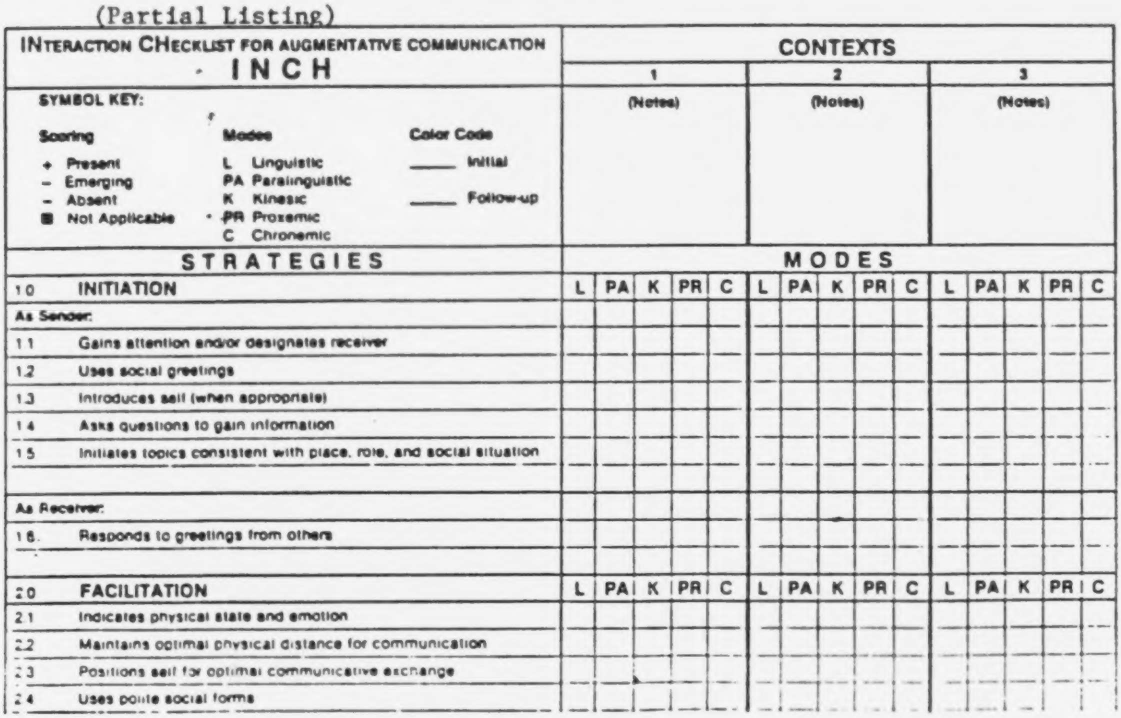
DESCRIBE PHYSICAL POSITIONING AND MOTOR ACCESS: ____________

IDENTIFY THE CONTEXT:

| | INITIAL | | FOLLOW-UP | |
|---|---|---|---|---|
| | Place: ______ | Date: ______ | Place: ______ | Date: ______ |
| 1. ______ | Receiver: ______ | Observer: ______ | Receiver: ______ | Observer: ______ |
| | Place: ______ | Date: ______ | Place: ______ | Date: ______ |
| 2. ______ | Receiver: ______ | Observer: ______ | Receiver: ______ | Observer: ______ |
| | Place: ______ | Date: ______ | Place: ______ | Date: ______ |
| 3. ______ | Receiver: ______ | Observer: ______ | Receiver: ______ | Observer: ______ |

CONTEXTS: Familiar-Trained  Familiar-Untrained  Unfamiliar-Untrained

ILLUSTRATIVE EXAMPLE:
(Partial Listing)



**INTERACTION CHECKLIST FOR AUGMENTATIVE COMMUNICATION**
**· I N C H**

SYMBOL KEY:

| Scoring | Modes | Color Code |
|---|---|---|
| + Present | L Linguistic | ____ Initial |
| – Emerging | PA Paralinguistic | ____ Follow-up |
| – Absent | K Kinesic | |
| ■ Not Applicable | PR Proxemic | |
| | C Chronemic | |

CONTEXTS: 1 (Notes) 2 (Notes) 3 (Notes)

| STRATEGIES | L | PA | K | PR | C | L | PA | K | PR | C | L | PA | K | PR | C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.0 INITIATION | L | PA | K | PR | C | L | PA | K | PR | C | L | PA | K | PR | C |
| As Sender: | | | | | | | | | | | | | | | |
| 1.1 Gains attention and/or designates receiver | | | | | | | | | | | | | | | |
| 1.2 Uses social greetings | | | | | | | | | | | | | | | |
| 1.3 Introduces self (when appropriate) | | | | | | | | | | | | | | | |
| 1.4 Asks questions to gain information | | | | | | | | | | | | | | | |
| 1.5 Initiates topics consistent with place, role, and social situation | | | | | | | | | | | | | | | |
| As Receiver: | | | | | | | | | | | | | | | |
| 1.6. Responds to greetings from others | | | | | | | | | | | | | | | |
| 2.0 FACILITATION | L | PA | K | PR | C | L | PA | K | PR | C | L | PA | K | PR | C |
| 2.1 Indicates physical state and emotion | | | | | | | | | | | | | | | |
| 2.2 Maintains optimal physical distance for communication | | | | | | | | | | | | | | | |
| 2.3 Positions self for optimal communicative exchange | | | | | | | | | | | | | | | |
| 2.4 Uses polite social forms | | | | | | | | | | | | | | | |

Bolton and Dashiell, 1984

## SUMMARY SHEET

Name: ______________________________ Recorder: ______________

**SYMBOL KEY**

| | | | | | |
|---|---|---|---|---|---|
| + | Present | INT | Initiation | L | Linguistic |
| – | Emerging | FAC | Facilitation | PA | Paralinguistic |
| – | Absent | REG | Regulation | K | Kinesic |
| | | TER | Termination | PR | Proxemic |
| | | | | C | Chronemic |

| | Initial Intervention Plan | | STRATEGIES | | | | MODES | | | | | Follow-Up Progress |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CONTEXT 1 | Date: __________ | | INT | FAC | REG | TER | L | PA | K | PR | C | Date: __________ |
| | | + | | | | | | | | | | |
| | | – | | | | | | | | | | |
| | | – | | | | | | | | | | |
| CONTEXT 2 | Date: __________ | | INT | FAC | REG | TER | L | PA | K | PR | C | Date: __________ |
| | | + | | | | | | | | | | |
| | | – | | | | | | | | | | |
| | | – | | | | | | | | | | |
| CONTEXT 3 | Date: __________ | | INT | FAC | REG | TER | L | PA | K | PR | C | Date: __________ |
| | | + | | | | | | | | | | |
| | | – | | | | | | | | | | |
| | | – | | | | | | | | | | |

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## QUESTIONNAIRE FOR OBSERVERS
## FORCED CHOICE JUDGEMENTS

Sample # __________

Underline the word which best describes each partner's role in the conversation you observed:

| | HANDICAPPED | NORMAL |
|---|---|---|
| 1. Was he an active or a passive partner in the conversation | Passive/Active | Passive/Active |
| 2. Did he function mostly as a sender or as a receiver, or did he send and receive relatively equally? | Sender/<br>Receiver/<br>Equal | Sender/<br>Receiver/<br>Equal |
| 3. Was he mostly a question answerer or a question asker, or did he ask and answer about equally? | Asker/<br>Answerer/<br>Equal | Asker/<br>Answerer/<br>Equal |
| 4. Did he seem to you to be a participant in the conversation or did he seem to be a victim of it? | Participant/<br>Victim | Participant/<br>Victim |
| 5. Comparing the partners would you describe one as leading or as being led, or were they about equal? | Leader/<br>Led/<br>Equal | Leader/<br>Led/<br>Equal |
| 6. Was he dominant or submissive or were both partners in the conversation of about equal strength? | Dominant/<br>Submissive/<br>Equal | Dominant/<br>Submissive/<br>Equal |
| 7. Was he best described as "talking" or as "talked to"? | Talking/<br>Talked to | Talking/<br>Talked to |
| 8. In your overall view was he a good or poor communicator in the conversation you observed? | Good/<br>Poor | Good/<br>Poor |

Buzolich, 1983
Modified from Holland (1982)

## QUESTIONNAIRE FOR OBSERVERS
## SCALED COMPETENCY MEASURE

Sample # __________

1. Circle the number that best rates the skill of the normal speaker in communicating with the handicapped speaker from your own perspective:

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Little skill in communicating with handicapped speaker | | | | Skillful in communicating with handicapped speaker |

2. Circle the number that best rates the adequacy of the handicapped speaker's overall communication:

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Minimal, ineffective communication | | | | Effective communication |

3. Circle the number that best rates the conversation with respect to the overall quality:

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Conversation difficult to understand and ineffective | | | | Conversation clear and effective |

4. Circle the number that best rates how competent the handicapped speaker is with respect to his proficiency in using the present system of communication:

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Incompetent | | | | Competent |

5. Circle the number that best rates how competent the handicapped speaker is with respect to his ability to specifically communicate his thought, idea, or experience using the present system of communication:

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Incompetent | | | | Competent |

OPEN COMMENT: ____________________________________________

____________________________________________

____________________________________________

Buzolich, 1983
Modified from Holland (1982)

## CLINICAL FORMS - INTERACTION
(Eddins & Fleming, 1984)

The Communicative Behavior Inventory (CBI) is a criterion-referenced assessment tool developed for use with augmentative system users (ASU), persons for whom speech is not the primary expressive mode for communication. The CBI seeks to determine which ASU communicative behaviors contribute to effective interaction and which do not. It provides a method for analyzing a videotaped ASU - unfamiliar conversational partner (P) interaction. Obtained through this analysis are measures of the ASU's basic conversational skills and a profile of the ASU's interaction skills and style.

During the past year, the CBI has been used as part of the pre- and post-intervention assessment battery for nonverbal children, 5 to 15 years of age, admitted to Lenox Baker Children's Hospital, Durham, North Carolina. Ten of these ASUs were admitted to Lenox Baker for intensive interdisciplinary evaluation and treatment by the Rehabilitation Staff, Lenox Baker, and the Augmentative Communication Team, Division for Disorders of Development and Learning, The University of North Carolina at Chapel Hill.

Originally, the CBI was designed to provide quantitative and qualitative data on an ASU's communication abilities and acceptance of conversational responsibility when interacting with an unfamiliar but interested person. Based on a review of current literature in the areas of pragmatics and nonverbal communication, these variables were chosen for analysis: communicative intents, expressive modes, topic initiations, methods of message elicitation by partners and response appropriateness. The resulting data did not differentiate between effective and ineffective augmented communicators in terms of ASU acceptance of responsibility for initiating and maintaining interaction; nor did it allow one to "see" the flow of conversation between the ASU and P. Thus, the CBI has undergone several transitions during the year of clinical application.

Currently, the CBI codes the conversational turn functions expressed by the ASU and P in each topic segment occuring in the videotaped interaction. These are recorded on the CBI-Conversational Data Sheet. Conversational turn functions include: Comments, Asks Question, Answers Question - Minimal or Expanded, Makes Request, Responds to Request. In addition, topic initiations are recorded. Unintelligible and inappropriate messages are coded as such and conversational turns devoted to repair of communication breakdown are tallied.

Messages, verbal and nonverbal, are scored according to their primary intended function in the context of the interaction. Determining intent may require some degree of subjectivity. Definitions of conversational turn functions have been developed to provide guidance in message coding.

Sections I and II of the CBI-Conversational Summary Form analyze information from the CBI-Conversational Data Sheet. Results include a general analysis of conversational turns, and frequency counts and percentages of ASU turns used for the various conversational turn functions.

The CBI-Conversational Data Sheet is designed to allow optional recording of data on question types, unintelligible expressive modes, inappropriate messages, repair strategies and topic termination. The CBI-Conversational Summary Form offers analysis formats for each of these data groups (Sections III through VII). It is strongly recommended that the initial administration of the CBI include collection and analysis of both required and optional data.

(c) Eddins, C. & Fleming, M., 1984)

In addition to collection and analysis of objective information regarding an ASU's communicative behaviors, the CBI includes a format for recording more subjective observations of an ASU's interactive skills and style. The CBI-Profile of ASU Interaction Skills is divided into four parts: Willingness to Communicate, Modes and Complexity of Messages, Communicative Purposes, and Conversation Participation and Maintenance Skills. The variables included in the Profile reflect concerns noted in the literature on augmented communication and those recognized through clinical experience with ASUs.

The information resulting from analyses and observations of ASU - P interactions made according to the CBI can be used to aid in establishing goals for intervention and to document changes in ASU communicative behaviors over time. All results should be interpreted in light of an individual ASU's current and potential abilities and needs.

## General Description of Procedure

The videotaping is done through a two-way mirror. A 20-25 minute interaction session is recommended. The conversational partner attempts to impose minimal structure on the interaction, following the ASU's lead whenever possible. However, the partner should be prepared to facilitate initiation and maintenance of topical conversation. He/She assures that the ASU has opportunities to exhibit the behaviors included on the CBI-Conversational Data Sheet and the CBI-Profile of ASU Interaction Skills.

A partner who is familiar with the CBI and experienced at interacting with ASUs is the preferred scorer. Scoring should be completed soon after videotaping. The scorer views the entire video, identifying topic segments and recording topic changes on the CBI-Conversational Data Sheet. Each topic segment is scored separately. During a second viewing, the scorer pauses the tape as often as is needed to record data. When the interaction has been scored, data are analyzed on the CBI-Conversational Summary Form. The scorer completes the CBI-Profile of ASU Interaction Skills, as does the interviewer if he/she is not the scorer.

## Current Status of the CBI

Reliability studies are being conducted on the CBI at this time. Pending completion of this work, the CBI is being used for research purposes only.

## Acknowledgement

Development of the Communicative Behavior Inventory was supported in part by a grant from the North Carolina Developmental Disabilities Council.

(c) Eddins, C. & Fleming, M., 1984

INTERACTIVE SEQUENCE 2.6.0
PUPIL NAME ____________________
DATE ____________________

## INTERACTIVE ASSESSMENT

| | | | |
|---|---|---|---|
| N/A N/I<br>☐<br>2.6.1 Demonstrates an appropriate affect (facial expression) during communication. | N/A N/I<br>☐<br>2.6.2 Uses system imitatively. | N/A N/I<br>☐<br>2.6.3 Uses system when elicited through questioning. | N/A N/I<br>☐<br>2.6.4 Uses system when elicited through an environmental set-up |
| N/A N/I<br>☐<br>2.6.5 Uses system spontaneously as a response to intrinsic need, thought or feelings. | N/A N/I<br>☐<br>2.6.6 Uses system spontaneously as a responding system appropriately in conversation. | N/A N/I<br>☐<br>2.6.7 Uses system spontaneously to initiate conversation. | N/A N/I<br>☐<br>2.6.8 Maintains appropriate social distance when communicating. |
| N/A N/I<br>☐<br>2.6.9 Waits to be acknowledged. | N/A N/I<br>☐<br>2.6.10 Maintains eye contact as a listener. | N/A N/I<br>☐<br>2.6.11 Participates in turn-taking aspects of conversation listen/express appropriately. | N/A N/I<br>☐<br>2.6.12 Accepts responsibility for the communication system and uses it spontaneously in selected important environments (therapy, home, school). (Refer to Environmental Assessment) |

© Mills, J. and Higgins, J., 198

INTERACTIVE SEQUENCE
PUPIL NAME ____________________
DATE ____________________

INTERACTIVE ASSESSMENT

N/A N/I

☐

**2.6.13** Accepts responsibility for the communication system and uses it spontaneously in many different environments.

N/A N/I

☐

**2.6.14** Can teach others how to use system. (Refer to Mechanic 2.5.13.)

N/A N/I

☐

**2.6.15** Uses many strategies to clarify listener misunderstandings.

N/A N/I

☐

**2.6.16** Intentionally makes appropriate humorous remarks with communication system.

N/A N/I

☐

**2.6.17** Concludes or accepts conclusion of conversation in a polite way.

N/A N/I

☐

**2.6.18** Initiates and/or pursues topics in conversation consistent with place, role, social situation.

*Note whether most interaction occurs:

___ one-to-one

___ group

___ both

(c) Mills, J. and Higgins, J., 1983

## CONVERSATION INTENT INVENTORY

NAME DATE

**PARTICIPANTS** (check appropriate box or boxes)

☐ Parent or Primary Care Giver
☐ Peers
☐ Teacher
☐ Minimal Care Giver
☐ Strangers

**SETTING** (check appropriate boxes)

☐ School
☐ Work
☐ Home
☐ Community
☐ Structured
☐ Unstructured

Indicate each intent used during the time segment
Mark "I" (Initiates) or "R" (Responds)

Minutes Timed

| INTENT | | | | | | | | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Affirm | | | | | | | | | | | |
| Comment | | | | | | | | | | | |
| Entertain | | | | | | | | | | | |
| Greet | | | | | | | | | | | |
| Inform-Report | | | | | | | | | | | |
| Negate | | | | | | | | | | | |
| Persuade | | | | | | | | | | | |
| Question | | | | | | | | | | | |
| Request | | | | | | | | | | | |
| Thank | | | | | | | | | | | |

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## INTERACTION INVENTORY

NAME ____________________ DATE __________

**PARTICIPANTS** (check appropriate box or boxes)

☐ Parent or Primary Care Giver
☐ Peers
☐ Teacher
☐ Minimal Care Giver
☐ Strangers

**SETTING** (check appropriate boxes)

☐ School
☐ Work
☐ Home
☐ Community
☐ Structured
☐ Unstructured

Indicate all topics covered during the time segment
Mark "I" (Initiates) or "R" (Responds)
Minutes Timed

| TOPIC | | | | | | | | | | | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ACADEMIC | | | | | | | | | | | |
| ACTIVITIES OF DAILY LIVING | | | | | | | | | | | |
| Eating | | | | | | | | | | | |
| Dressing | | | | | | | | | | | |
| Grooming | | | | | | | | | | | |
| Toileting | | | | | | | | | | | |
| EMERGENCY | | | | | | | | | | | |
| Assistance | | | | | | | | | | | |
| Medical | | | | | | | | | | | |
| JOB RELATED | | | | | | | | | | | |
| LEISURE TIME | | | | | | | | | | | |
| Books | | | | | | | | | | | |
| Games | | | | | | | | | | | |
| T.V. – Movies | | | | | | | | | | | |
| Other | | | | | | | | | | | |
| NEWS – CURRENT TOPICS | | | | | | | | | | | |
| RECREATIONAL | | | | | | | | | | | |
| Entertainment | | | | | | | | | | | |
| Music | | | | | | | | | | | |
| Sports – Games | | | | | | | | | | | |
| Travel | | | | | | | | | | | |
| SMALL TALK | | | | | | | | | | | |
| Children | | | | | | | | | | | |
| Pets | | | | | | | | | | | |
| Weather | | | | | | | | | | | |
| SOCIAL – PERSONAL | | | | | | | | | | | |
| Emotions | | | | | | | | | | | |
| Interpersonal Relations | | | | | | | | | | | |
| SOCIAL – POLITE | | | | | | | | | | | |
| Greetings | | | | | | | | | | | |
| Thank – Request | | | | | | | | | | | |

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## GOAL PLACEMENT SURVEY: COMMUNICATION BOARDS

| Goals | | Entry Behavior | Date Achieved | Comments |
|---|---|---|---|---|
| Pre-Operational Goals: | A communication board (book) will be constructed and pre-requisite skills for its effective use, will be taught. | | | |
| Objective I | 1. The picture communication book will be designed and developed | | | |
| Task | 1. Symbol system will be determined<br>2. Vocabulary will be selected<br>3. Display items will be collected<br>4. Format will be chosen<br>5. Communication book will be constructed | | | |
| Objective II | Train in the pre-requisite skills needed to use the communication book | | | |
| Task | 1. Makes choices in selection of concrete objects<br>2. Develop consistant yes-no response<br>3. Attends to pictures | | | |
| Operational Goal: | The use of a communication board (book) will be constructed to enable non-vocal clients to get their needs met and increase social interactions. | | | |
| Objective I | Train the pointing response | | | |
| Task | 1. Points with physical help<br>2. Points in imitation<br>3. Points on request "Show me" "Touch" by pointing to the appropriate picture<br>4. Points in response to a question, by answering the query<br>5. Points spontaneously to request an item<br>6. Points spontaneously to comment<br>7. Points spontaneously to converse with turn taking | | | |
| Objective II | Train in use of picture book | | | |
| Task | 1. Find the proper vocabulary section<br>2. Learns the location of individual pictures<br>3. Uses the book to communicate | | | WASSON |

## GOAL PLACEMENT SURVEY: AUGMENTATIVE DEVICE

| Goals | | Entry Behavior | Date Achieved | Commer |
|---|---|---|---|---|
| Pre-Operational Goals: | A communication system will be selected and pre-requisite skills for its effective use, will be taught. | | | |
| Objective I | Train in the pre-requisite skills needed to use the communication system | | | |
| Task | 1. Makes choices in selection of concrete objects<br>2. Develop consistant yes-no response<br>3. Attends to pictures | | | |
| Operational Goal: | The use of a communication system will be taught to enable non-vocal clients to get their needs met and increase social interactions. | | | |
| Objective I | Train in the operation of the system | | | |
| Task | 1. Turns on the system<br>2. Assesses the display<br>3. Find the proper vocabulary section<br>4. Learns the location of individual items<br>5. Uses the system to communicate<br>6. Increases speed of operation | | | |
| | | | | WASSON |